

Contractors *and* Engineers Monthly

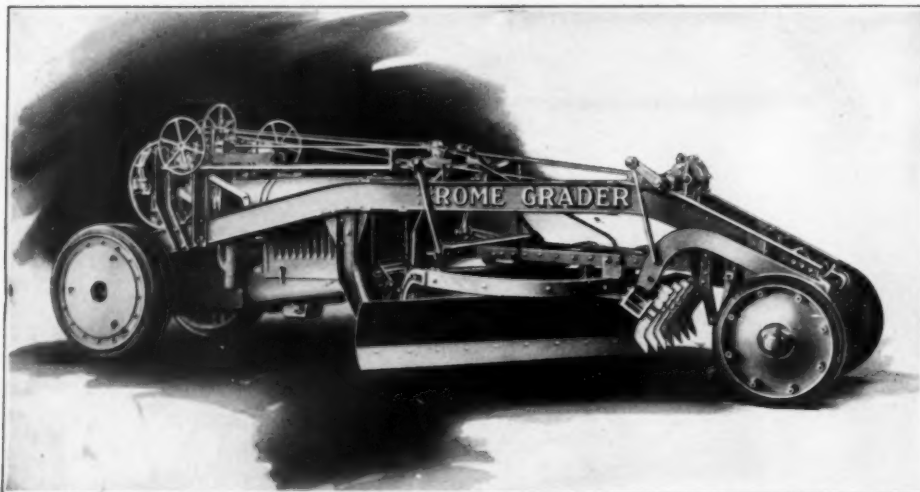
DECEMBER, 1927
25 Cents \$1 a Year

Looking down the 24-inch belt conveyor used for reclaiming sand and stone from storage and delivering to hoppers over the concrete mixing plant at the West Side Sewage Treatment Works, Chicago, Ill. See page 61 for further illustrations.



Announcing the New

ROME (PATENTED) HIGH LIFT MOTOR GRADER



A Powerful—Practical Road Builder and Maintainer
STRENGTH — WEIGHT — and — PERFECT BALANCE

The above illustration shows an improved ROME Grader, combined with International McCormick-Deering tractor.

The new ROME HIGH LIFT MOTOR GRADER with its many improved features, is a further advance in the producing of better and more efficient Road Building Equipment. It carries along a step further the newer ideas that were introduced with the original ROME Grader and, after further improvements, is combined with an adequate and time-tested power unit, the McCormick-Deering tractor. ROME Motor Graders will be supplied with both regular wheel and crawler traction. Great care was exercised in designing so that the completed machine would have necessary weight so distributed as to hold to the work, and still respond quickly and easily to the manipulations of the operating controls.

FRAME: Is made especially strong. The heaviest 8" I-Beams 25½ pounds to the foot are used.

FRONT TRUCK: Is built wide and of sufficient weight to keep the wheels down and at all times in proper steering position. Weight properly balanced at this point avoids skidding and holds the scarifier to its work.

HIGH LIFT: This patented ROME feature is

retained in the motor-driven machine, allowing a wider range of operations than were ever before possible with a grader of this type.

EXTRA LARGE CIRCLE: The circle of the ROME Grader is the best yet devised. It is not only immensely strong, but extra large in size. This results in that most important part of a grader—the blade being held in its position permanently and rigidly.

SCARIFIER ATTACHMENT: Can be operated independently or in conjunction with the blade, making it possible to tear up and re-grade in a single operation.

CONTROLS: Operation is simplified and made easier by having all of these within convenient reach of the operator's platform.

TIMKEN BEARINGS & ALEMITE LUBRICATION: These contribute further toward the perfection of this new Motor Driven ROME Grader.

ECONOMY: This is a grader for all-around road work and for snow removal. Makes State, County, Township and Municipal Highway funds go the furthest.

AT THE
ROAD SHOW,
in
Cleveland, Ohio,

January 30th-14th, this
ROME Motor Grader
will be displayed, along
with other items of the
ROME line.

Visit
CENTRAL
ARMORY SPACE
A-Y-31

ROME MANUFACTURING COMPANY Rome, New York **Locomotive Dept.**

AERIAL
*Ame
Broc
Haa
A. L

AIR C
*Ame
Ch
*Buhl
*Cem
*Cook
*Dom
*Gard
*Novo
*O. K
*Stov
*Sull
Allis
Barn
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Fair
Gene
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Indep
Indie
Lager
Nord
Norw
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Worl

AIR CO
*Ceme
*Dome
pen
Inger
AEC L
Gener
West
E.

ARTES
*Star
Am. V
Inger

ABEST
*Philip
Kearb
Mike
Norris
town
Sall M

ASH HA
*Chain

Where to Purchase

A comprehensive classification of the leading machinery and supply manufacturers arranged for the convenience of contractors, engineers and public officials who may wish to secure information about construction equipment. The Index to Advertisers faces the inside back cover. When writing to advertisers please mention the **CONTRACTORS' & ENGINEERS' MONTHLY**. A star (*) before the manufacturer's name indicates that his advertisement appears in this issue.

This index is published as an aid to the reader, but the publishers assume no responsibility for errors or omissions.

AERIAL WIRE ROPE TRAMWAYS

- *Amer. Steel & Wire Co., Chicago
- Broderick & Bascom Rope Co., St. Louis
- Hazard Mfg. Co., Wilkesbarre, Pa.
- A. Leschen & Sons Rope Co., St. Louis

AIR COMPRESSORS

- *American Steam Pump Co., Battle Creek, Mich.
- *Buhl Co., Chicago
- *Cement-Gun Co., Allentown, Pa.
- *Cook Motor Co., Delaware, O.
- *Domestic Eng. & Pump Co., Shippensburg, Pa.
- *Gardner-Denver Co., Denver, Col.
- *Wave Engine Co., Lansing, Mich.
- *O. K. Clutch & Mach. Co., Columbia, Pa.
- *Stover Mfg. & Eng. Co., Freeport, Ill.
- *Sullivan Mch. Co., Chicago
- Allis-Chalmers Mfg. Co., Milwaukee
- Barnes Mfg. Co., Mansfield, O.
- Chicago Pneumatic Tool Co., N. Y.
- Curtis Pn. Mch. Co., St. Louis, Mo.
- De Laval Stm. Turb. Co., Trenton, N. J.
- Fairbanks, Morse & Co., Chicago
- General Elec. Co., Schenectady, N. Y.
- Hardie-Tynes Mfg. Co., Birmingham, Ala.
- Independent Pneum. Tool Co., Chicago
- Indiana Air Pump Co., Indianapolis, Ind.
- Ingersoll-Rand Co., N. Y.
- Nordberg Mfg. Co., Milwaukee
- Norwalk Ir. Wks. Co., So. Norwalk, Ct.
- Schramm, Inc., West Chester, Pa.
- United Iron Wks., Kans. City, Mo.
- Westinghouse Trac. Brake Co., Wl. merding, Pa.
- Worthington Pump & Mch. Corp., N.Y.

AIR COMPRESSORS, PORTABLE

- *Cement-Gun Co., Allentown, Pa.
- *Domestic Engine & Pump Co., Shippensburg, Pa.
- Ingersoll-Rand Co., N. Y.

ARC LAMPS

- General Elec. Co., Schenectady, N. Y.
- Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

ARTESIAN WELL DRILLS & PUMPS

- *Star Drilling Mach. Co., Akron, O.
- Am. Well Works, Aurora, Ill.
- Ingersoll-Rand Co., New York

ASBESTOS PRODUCTS

- *Phillip Carey Co., Cincinnati
- Keasbey & Mattison Co., Ambler, Pa.
- Mikeell Bros. Co., Wabash, Ind.
- Norristown Mag. & Asb. Co., Norristown, Pa.
- Sall Mountain Co., Chicago

ASH HANDLING MACHINERY

- *Chain Belt Co., Milwaukee

*Chicago Automatic Conv. Co., Chicago.

- *Erie Steam Shovel Co., Erie, Pa.
- *Geo. Haiss Mfg. Co., N. Y.
- *Mack Trucks, Inc., N. Y.
- *Lakewood Eng. Co., Cleveland, O.
- *Link-Belt Co., Chicago
- *Mead-Morrison Mfg. Co., E. Boston, Mass.
- *Orton Crane & Shovel Co., Chicago
- Atia-Corp., New York
- C. O. Bartlett & Snow Co., Cleveland, O.
- Brown Hoisting Mach. Co., Cleveland, O.
- Byers Mach. Co., Ravenna, O.
- Gifford-Wood Co., Hudson, N. Y.
- Green Eng. Co., E. Chicago, Ind.
- Jeffrey Mfg. Co., Columbus, O.
- Portable Mach. Co., Clifton, N. J.
- Robins Conv. Belt Co., N. Y.
- Jas. B. Seaverns Co., Batavia, Ill.
- Webster Mfg. Co., Chicago
- Weller Mfg. Co., Chicago

ASPHALT

- *Barber Asphalt Co., Philadelphia
- *Barrett Co., N. Y.
- *Standard Oil Co. (Ind.), Chicago
- *Standard Oil Co. (N. Y.), N. Y.
- *Warren Bros. Co., Boston
- Atlantic Ref. & Asph. Corp., Phila.
- Gulf Refining Co., Pittsburgh
- Ky. Rock Asph. Co., Louisville, Ky.
- Natural Rt. Asph. Corp., Owensboro, Ky.
- New Orleans Ref. Co., New Orleans
- Pioneer Asph. Co., Lawrenceville, Ill.
- Sinclair Ref. Co., Chicago
- Standard Oil Co. of Cal., S. Francisco
- Standard Oil Co. of La., N. Orleans
- Standard Oil Co. of N. J., Newark
- Texas Co., N. Y.

ASPHALT BLOCK

- Hastings Pavement Co., N. Y.

ASPHALT BRICK

- Asphalt Brick Co., St. Louis

ASPHALT CUTTERS

- *Gardner-Denver Co., Denver, Col.
- *Littleford Bros., Cincinnati
- *Sullivan Machinery Co., Chicago
- Chicago Pneumatic Tool Co., N. Y.
- Cleveland Rock Drill Co., Cleveland, O.
- Dayton Pneum. Tool Co., Dayton, O.
- Independent Pn. Tool Co., Chicago, Ill.
- Ingersoll-Rand Co., N. Y.

ASPHALT KETTLES (See Kettles for Asphalt and Tar Heating)

ASPHALT PLANTS, TOOLS, ETC.

- *Aeroli Burner Co., West New York, N.J.
- *Barber Asphalt Co., Philadelphia
- *Littleford Bros., Cincinnati, O.
- *Warren Bros. Co., Boston

American Fin-Mix Co., Chicago, Ill.

- Chausse Oil Burner Co., Elkhart, Ind.
- F. D. Cummer & Son Co., Cleveland, O.
- J. D. Farasey Mfg. Co., Cleveland, O.
- Hetherington & Berner, Indianapolis
- Hauck Mfg. Co., Bklyn, N. Y.
- Merriman Asphalt Plant, Inc., Lima, O.
- Mosher Mfg. Co., Chicago, Ill.

ASPHALT ROLLERS (See Road Rollers)

ASPHALT SURFACE HEATERS

- *Aeroli Burner Co., West New York, N.J.
- *Barber Asphalt Co., Philadelphia
- Chausse Oil Burner Co., Elkhart, Ind.
- Equitable Asp. Maint. Co., Kan. C., Mo.
- Good Roads Equip. Corp., Phila.
- Hauck Mfg. Co., B'klyn, N. Y.

BACKFILLERS

- *Baker Mfg. Co., Springfield, Ill.
- *Bay City Dredge Wks., Bay City, Mich.
- *Buckeye Trac. Ditcher Co., Findlay, O.
- *Erie Steam Shovel Co., Erie, Pa.
- *Ersted Mch. Mfg. Co., Portland, Ore.
- *Koehring Co., Milwaukee, Wis.
- *LaPlant-Chaste Mfg. Co., Cedar Rapids, Iowa

- *Link-Belt Co., Chicago
- *Miami Trailer-Scraper Co., Troy, O.
- *Orton Crane & Shovel Co., Chicago
- *Parsons Co., Newton, Ia.
- *Speeder Mch. Corp., Cedar Rapids, Ia.
- *Star Drilling Mach. Co., Akron, O.
- *Waterman Corp., Detroit
- Austin Mach. Corp., Muskegon, Mich.
- Byers Machine Co., Ravenna, O.
- Construction Mch. Co., Waterloo, Ia.
- Harnischfeger Corp., Milwaukee, Wis.
- Lesman Loader Mfg. Co., Des Moines
- Weller Mfg. Co., Chicago

BAGS

- *Bates Valve Bag Corp., Chicago

BAR BENDERS AND CUTTERS

- *Koehring Co., Milwaukee, Wis.
- *Ransome Conc. Mch. Co., Dunellen, N.J.
- Buffalo Forge Co., Buffalo, N. Y.
- Concrete Steel Co., N. Y.
- Electric Welding Co., Pittsburgh
- D. A. Hinman & Co., Sandwich, Ill.
- J. L. Gleason & Co., Boston, Mass.
- McKenna Co., Cleveland, O.

BAR CHAIRS, REINFORCING

- *Truscon Steel Co., Youngstown, O.
- Concrete Steel Co., N. Y.
- Universal Form Clamp Co., Chicago

BAR TIES

- *Bates Valve Bag Co., Chicago

BATCH BOXES

- *Blaw-Knox Co., Pittsburgh, Pa.
- *Holtzel Stl. Form & Ir. Co., Warren, O.

For Leading Local Distributors of Contractors' Equipment in Each State, See Directory on pages 135 to 174.

Where to Purchase

- *Jos. Honhorst Co., Cincinnati
 *Lakewood Eng. Co., Cleveland, O.
 *Littleford Bros., Cincinnati.
 Easton Car & Const'n. Co., Easton, Pa.
 Easton Car & Const'n. Co. of Mo.,
 Kansas City, Mo.
 Erie Steel Const. Co., Erie, Pa.
 Koppel Ind. Car & Equip. Co., Koppel,
 Pa.
 Jas. B. Seaverns Co., Batavia, Ill.
 Western Wheeled Scraper Co., Aurora,
 Ill.
- BEARINGS**
 Fafnir Bearing Co., New Britain, Conn.
 Hyatt Roller Bear. Co., Harrison, N. J.
 New Departure Mfg. Co., Bristol, Conn.
 S. K. F. Industries, New York.
 Timken Roller Bearing Co., Canton, O.
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 *Austin-Western Rd. Mach. Co., Chicago.
 *Blaw-Knox Co., Pittsburgh, Pa.
 *Gallion Iron Wks. & Mfg. Co., Gallion, O.
 *Good Roads Mch. Co., Kennett Sq., Pa.
 *Helselt Stl. Form & Ir. Co., Warren, O.
 *Link-Belt Co., Chicago.
 *Somers Conc. Mch. Co., Dunellen, N.J.
 *Russell Grader Mfg. Co., Minneapolis.
 Austin Mfg. Co., Chicago.
 Birmingham Tank Co., Birmingham, Ala.
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 Butler Bin Co., Waukegan, Wis.
 Canton Art Metal Co., Canton, O.
 Easton Car & Const. Co., Easton, Pa.
 Erie Steel Const. Co., Erie, Pa.
 Fairfield Eng. Co., Marion, O.
 C. S. Johnson Co., Champaign, Ill.
 Pittsburgh-Des Moines Steel Co., Pitts-
 burgh, Pa.
 Jas. B. Seaverns Co., Batavia, Ill.
 Universal Rd. Mach. Co., Kingston, N.Y.
 Weiler Mfg. Co., Chicago.
- BLADES FOR GRADERS & SNOW
 FLOWS**
 *Gallion Iron Wks. & Mfg. Co., Gallion, O.
 *Russell Grader Mfg. Co., Minneapolis.
 J. D. Adams & Co., Indianapolis.
 Shank Mfg. Co., Bucyrus, O.
- BLAST HOLE DRILLING MACHINES**
 (See Well Drilling and Blast Hole
 Machines)
- BLASTING ACCESSORIES**
 E. I. du Pont de Nemours & Co., Wil-
 mington.
 Hercules Powder Co., Wilmington.
- BLASTING POWDER (See Explosives)**
- BLOCKS AND TACKLE**
 *Boston & Lockport Blk. Co., E. Boston,
 Mass.
 *Dobbie Fdry. & Mach. Co., Niagara
 Falls, N. Y.
 *Western Block Co., Lockport, N. Y.
- BLOW TORCHES**
 *Everhot Mfg. Co., Maywood, Ill.
- BLUE PRINT MACHINES**
 Paragon Mach. Co., Rochester, N. Y.
 C. F. Pease Co., Chicago.
 Wickes Bros., Saginaw, Mich.
- BODIES; SPECIAL FORD**
 Anthony Co., Streator, Ill.
 Standard Comm. Body Corp., B'klyn.
- BOILERS**
 *Johnston Bros., Inc., Ferrysburg, Mich.
 Chandler & Taylor Co., Indianapolis.
 Chatta. Boiler & Tank Co., Chatta., Tenn.
 R. D. Cole Mfg. Co., Newnan, Ga.
 Combustion Eng. Corp., N. Y.
 Erie City Iron Wks. Erie, Pa.
 Hartley Br. Wks. Montgomery, Ala.
 Heine Boiler Co., St. Louis, Mo.
 E. Keeler Co., Williamsport, Pa.
 Ladd Water Tube Br. Co., Pittsbrgh, Pa.
 V. Laffel & Co., Springfield, O.
 Lord & Burnham Co., Irvington, N. Y.
- Murray Iron Wks. Co., Burlington, Ia.
 Nagle Eng. & Blr. Wks. Erie, Pa.
 New Bern Iron Wks. & Sup. Co., New
 Bern, N. C.
 Petroleum Iron Wks. Co., Sharon, Pa.
 J. S. Schofield's Sons Co., Macon, Ga.
 Stanwood Corp., Cincinnati, O.
 Superior Body Corp., Marion, Ind.
 Vogt Mch. Co., Inc., Louisville, Ky.
 Walsh & Weidner Blr. Co., Chattanooga,
 Tenn.
- BRACES, TRENCH**
 *Hawley Mfg. Co., Chicago.
 *Templeton, Kenly & Co., Chicago
 Jas. H. Channon Mfg. Co., Chicago.
 Duff Mfg. Co., Pittsburgh, Pa.
 Kalamazoo Fdry. & Mach. Co., Kala-
 mazoo, Mich.
 Waldo Bros. & Bond Co., Boston.
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 *Everhot Mfg. Co., Maywood, Ill.
- BRASS GOODS**
 *Union Water Meter Co., Worcester, Mass.
 Glanber Brass. Mfg. Co., Cleveland, O.
 Haydensville Co., Haydensville, Mass.
 Hays Mfg. Co., Erie, Pa.
 Mueller Company, Decatur, Ill.
 United-Obendorf Corp., Cleveland, O.
- BREAKERS, CONCRETE**
 *Buckeye Trac. Ditcher Co., Findlay, O.
 *Gardner-Denver Co., Denver, Col.
 *Hardacog Wonder Drill Co., Ottumwa, Ia.
 *Sullivan Machy. Co., Chicago
 Chicago Pneumatic Tool Co., N. Y.
 Cleveland Rock Drill Co., Cleveland, O.
 Independent Pa. Tool Co., Chicago.
 Ingersoll-Rand Co., N. Y.
- BRICK, PAVING (See Paving Brick)**
- BRICK CLEANING MACHINES**
 Elgin Gas Motor Co., Elgin, Ill.
 Rotor Air Tool Co., Cleveland.
- BRIDGES, CONCRETE**
 *Frederick Snare Corp., New York
- BRIDGES AND BUILDINGS, STEEL**
 *Blaw-Knox Co., Pittsburgh, Pa.
 *Frederick Snare Corporation, N. Y.
 American Bridge Co., N. Y.
 Bellefontaine Br. & Stl. Co., Belle-
 fontaine, O.
 Belmont Iron Wks., Phila.
 Berlin Constr. Co., Berlin, Conn.
 Bethlehem Steel Co., Bethlehem, Pa.
 Boston Bridge Wks., Boston.
 Central States Br. Co., Ind'polis, Ind.
 Champion Bridge Co., Wilmington, O.
 Chesapeake Ir. Wks., Baltimore, Md.
 Clinton Bridge Wks., Clinton, Ia.
 Eastern Bridge & Struc. Co., Worcester,
 Mass.
 Flour City Orn. Iron Co., Minneapolis.
 Fort Pitt Br. Wks., Pittsburgh, Pa.
 Hughes-Keenan Co., Mansfield, O.
 Ingalls Ir. Wks. Co., Birmingham, Ala.
 Inter. Stl. & Ir. Co., Evansville, Ind.
 Lakeside Br. & St. Co., No. Milwaukee.
 Louisville Br. & Ir. Co., Louisville, Ky.
 McClintic Marshall Co., Pittsburgh, Pa.
 Milwaukee Br. Co., Milwaukee, Wis.
 Minn. Stl. & Mch. Co., Minneapolis.
 Missouri Vy. Br. & Ir. Co., Leaven-
 worth, Kan.
 Mt. Vernon Br. Co., Mt. Vernon, O.
 Penn. Bridge Co., Beaver Falls, Pa.
 Pittsburgh-Des Moines Stl. Co., Pitts-
 burgh, Pa.
 Richmond Struc. Stl. Co., Richmond,
 Va.
 Riverside Br. Co., Martins Ferry, O.
 Virginia Br. & Ir. Co., Roanoke, Va.
 Wisc. Br. & Ir. Co., No. Milwaukee, Wis.
- BRONZE TABLES**
 Flour City Orn. Ir. Co., Minneapolis.
 Imperial Brass Mfg. Co., Chicago.
 J. L. Mott Iron Wks., N. Y.
- BROOMS (See Street Sweeping Brooms)**
- BUCKETS, AUTOMATIC DUMPING**
- *Lakewood Eng. Co., Cleveland, O.
 *Union Iron Wks., Inc., Hoboken, N. J.
 G. L. Stuebner Ir. Wks., Inc., Long
 Island City, N. Y.
- BUCKETS, GLASS SHELL**
 *Blaw-Knox Co., Pittsburgh, Pa.
 *Geo. Haisa Mfg. Co., N. Y.
 *J. F. Kiesler Co., Chicago.
 *Lakewood Eng. Co., Cleveland, O.
 *Link-Belt Co., Chicago.
 *Mead-Morrison Mfg. Co., E. Boston, Mass.
 *Orton Crane & Shovel Co., Chicago.
 Brown Hoisting Mach. Co., Cleveland, O.
 Buffalo Hat. & Der. Co., Buffalo, N. Y.
 Browning Crane Co., Cleveland, O.
 F. A. Coleman Co., Cleveland, O.
 Erie Steel Const. Co., Erie, Pa.
 Hayward Co., N. Y.
 Industrial Wks., Bay City, Mich.
 McMyler Interstate Co., Cleveland, O.
 Owen Bucket Co., Cleveland, O.
 Page Eng. Co., Chicago
 G. H. Williams Co., Erie, Pa.
- BUCKETS, CONCRETE**
 *Insley Mfg. Co., Indianapolis, Ind.
 *Lakewood Eng. Co., Cleveland, O.
 *Ransome Conc. Mch. Co., Dunellen,
 N. J.
 *Union Iron Works, Inc., Hoboken, N. J.
 Koppel Ind. Car & Equip. Co., Koppel, Pa.
 G. L. Stuebner Ir. Wks., Inc., Long
 Island City, N. Y.
- BUCKETS, DRAGLINE**
 *Blaw-Knox Co., Pittsburgh, Pa.
 *Dobbie Fdry. & Mch. Co., Niagara
 Falls, N. Y.
 *Gallion Ir. Wks. & Mfg. Co., Gallion, O.
 *Link-Belt Co., Chicago.
 *Russell Grader Mfg. Co., Minneapolis
 *Sauerman Bros., Chicago.
 Beach Mfg. Co., Charlotte, Mich.
 R. H. Beaumont Co., Philadelphia
 Monaghan Mach. Co., Chicago.
 Page Eng. Co., Chicago.
 Pioneer Bucket Co., Indianapolis, Ind.
- BUCKETS, DREDGING AND EXCA-
 VATING**
 *Blaw-Knox Co., Pittsburgh, Pa.
 *Geo. Haisa Mfg. Co., N. Y.
 *J. F. Kiesler Co., Chicago.
 *Lakewood Eng. Co., Cleveland, O.
 *Link-Belt Co., Chicago.
 *Mead-Morrison Mfg. Co., E. Boston, Mass.
 *Orton Crane & Shovel Co., Chicago.
 Brown Hoisting Mach. Co., Cleveland, O.
 Browning Crane Co., Cleveland, O.
 Hayward Co., N. Y.
 Owen Bucket Co., Cleveland, O.
 G. H. Williams Co., Erie, Pa.
- BUCKETS, ORANGE PEARL**
 *J. F. Kiesler Co., Chicago.
 *Link-Belt Co., Chicago.
 *Mead-Morrison Mfg. Co., E. Boston, Mass.
 *Orton Crane & Shovel Co., Chicago.
 Brown Hoisting Mach. Co., Cleveland, O.
 Hayward Co., N. Y.
 Industrial Wks., Bay City, Mich.
 McMyler Interstate Co., Cleveland, O.
- BUILDING FORMS (See Forms, Conc.)**
- BUILDING, STEEL (See Bridges)**
- BULLDOZERS**
 *LaPlant-Choate Mfg. Co., Cedar Rapids,
 Iowa
- BUNKS AND COTS**
 Ft. Pitt Bedding Co., Pittsburgh, Pa.
 Haggard & Marcusson Co., Chicago.
 Southern Rome Co., Baltimore, Md.
- CABLES (See Wire and Cable)**
- CABLEWAYS, DRAGLINE**
 *S. Flory Mfg. Co., Bangor, Pa.
 *Link-Belt Co., Chicago.
 *Mead-Morrison Mfg. Co., E. Boston, Mass.
 *Russell Grader Mfg. Co., Minneapolis.
 *Sauerman Bros., Chicago.
 Street Bros. Mach. Wks., Chattanooga.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*

CONCRETE *PLUS* REINFORCING MEANS BETTER ROADS



Truscon Welded Steel Fabric increases road life and cuts maintenance costs. Stronger than additional thickness of concrete. Withstands heavy traffic. Preserves road surface. Easy to handle. Inexpensive in first cost. Economical to place.

Truscon furnishes a complete line of products for reinforcing concrete roads, driveways, etc. They are designed for ease of handling, speed of construction, permanence and economy.

You'll find the complete story in our new handbook "Modern Road Construction." Write for a free copy.

TRUSCON

TRUSCON STEEL CO., Youngstown, Ohio
Established 1903


Warehouses and Offices in all Principal Cities

Visit our Exhibit at the Annual Road Convention of the American Road Builders Association in Cleveland, January 9 to 13, 1928


When writing to advertisers please mention the CONTRACTORS AND ENGINEERS MONTHLY—Thank You.

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PRODUCTS FOR
REINFORCING
ROADS AND PAVEMENTS



WELDED STEEL FABRIC




CONTRACTION JOINTS



STEEL ROAD FORMS



RIB BARS CURB BARS



EXPANDED METAL

Welded Steel Fabric for Permanency
Contraction Joints for Safety
Steel Road Forms for Economy
Rib Bars for Reinforcing
Curb Bars for Protection

Where to Purchase

CARS FOR MOTOR TRUCKS

Highland Body Mfg. Co., Cincinnati, O.
Weatherproof Body Corp., Corunna, Mich.

CAISSONS

American Bridge Co., N. Y.
Biggs Boiler Wks., Akron, O.
Birmingham Tank Co., Birmingham, Ala.
Foundation Co., N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
O'Rourke Eng. Constr. Co., N. Y.
Petroleum Ir. Wks. Co., Sharon, Pa.

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*Dow Chemical Co., Midland, Mich.
*Solvay Sales Corp., New York.
Carbondale Calcium Co., Carbondale, Pa.

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American Can Co., N. Y.
Butler Mfg. Co., Minneapolis.
Canton Art Metal Co., Canton, O.
Economy Baler Co., Ann Arbor, Mich.
Rochester Can Co., Rochester, N. Y.
Solar-Stargis Mfg. Co., Melrose Pk., Ill.
Steel Basket Co., Cedar Rapids, Ia.

CARBIDE LIGHTS

*National Carbide Sales Corp., New York

CAR UNLOADERS (See Loaders)

CARS, INDUSTRIAL V. DUMPING

*Insley Mfg. Co., Indianapolis, Ind.
*Lakewood Eng. Co., Cleveland, O.
Atlas Car & Mfg. Co., Cleveland, O.
Austin Mfg. Co., Chicago
Chase Fdry., & Mfg. Co., Columbus, O.
Easton Car & Const. Co., Easton, Pa.
C. W. Hunt Co., W. New Brighton, N.Y.
Koppel Ind. Car & Equip. Co., Koppel, Pa.
G. L. Stuebner Jr. Wks., Inc., Long Island City, N. Y.
United Ir. Wks. Inc., Kans. City, Mo.
Weller Mfg. Co., Chicago
Whiting Corp., Harvey, Ill.

CARTS, CONCRETE

*General Wheelbarrow Co., Cleveland, O.
*Insley Mfg. Co., Indianapolis, Ind.
*Lakewood Eng. Co., Cleveland, O.
Lansing Co., Lansing, Mich.
*Ransome Conc. Mch'y. Co., Dunellen, N.J.
*Sterling Wheelbarrow Co., Milwaukee
*Toledo Wheelbarrow Co., Toledo, O.
Chattanooga Wheelbarrow Co., Chattanooga, Tenn.
Cleveland Wheelbarrow Co., Cleveland, O.
Easton Car & Const. Co., Easton, Pa.
E. D. Enayre & Co., Oregon, Ill.
Gray Iron Fdry., Reading, Pa.
Jackson Mfg. Co., Harrisburg, Pa.
Lee Trailer & Body Co., Plymouth, Ind.

CAST IRON PIPE (See Pipe, Cast Iron)

CASTINGS, STREET AND SEWER

*Central Fdry., Co., N. Y.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*U. S. Cast Ir. Pipe & Fdry. Co., Burlington, N. J.
Burch Corp., Crestline, O.
Canton Fdry. & Mach. Co., Canton, O.
Casey-Hedges Co., Chattanooga, Tenn.
H. W. Clark Co., Mattson, Ill.
J. B. Clow & Sons, Chicago.
W. E. Dee Co., Chicago.
Elkhart Fdry. & Mach. Co., Elkhart, Ind.
Gilbert Mfg. Co., Aberdeen, S. Dak.
Klaner Mfg. Co., Dubuque, Ia.
Madison Fdry. Co., Cleveland, O.
Pechstein Iron Works, Keokuk, Ia.
Sessions Foundry Co., Bristol, Conn.
South Bend Fdry. Co., So. Bend, Ind.

CATCH BASINS (See Castings, Street)

CATCH BASIN CLEANING OUTFITS

*Mack Trucks, Inc., N. Y.
Atlas Corp., N. Y.
Elgin Sales Corp., N. Y.
Movakan Co., Indianapolis, Ind.

CAULKING MACHINERY AND TOOLS

Cleveland Rock Drill Co., Cleveland, O.
Helwig Mfg. Co., St. Paul, Minn.

Independent Pn. Tool Co., Chicago.
Ingersoll-Rand Co., N. Y.
Mueller Company, Decatur, Ill.

CEILING, METAL

Berger Mfg. Co., Canton, O.
Canton Art Metal Co., Canton, O.
Globe Iron Roofing & Cor. Co., Cincinnati, O.
Newport Rolling Mill Co., Newport, Ky.
Klaner Mfg. Co., Dubuque, Ia.
Geo. L. Mesker & Co., Evansville, Ind.
Milwaukee Corr. Co., Milwaukee.
Republic Ir. & Stil. Co., Youngstown, O.
Wheeling Corr. Co., Wheeling, W. Va.

CEMENT (P. C. stands for Portland Cement)

*Pennsylvania-Dixie Cement Corp., N. Y.
(Brands: Pennsylvania, Dexter, Penn.-Allen, Royal & Clinchfield P. C.)
Acme Cement Corp., Catskill, N. Y.
Etna P. O. Co., Detroit, Mich.
Alabama P. C. Co., Birmingham, Ala.
Allentown P. C. Co., Catasauqua, Pa.
Alpha P. C. Co., Easton, Pa.
Ash Grove Lime and P. C. Co., Kansas City, Mo.
Atlas P. C. Co., N. Y.
Reayer P. C. Co., Portland, Ore.
Bessemer Limestone & C. Co., Youngstown, O.
British Col. Cement Co., Victoria, B. C.
Canada Cement Co., Ltd., Montreal, Canada.
Colorado P. C. Co., Denver, Colo.
Consolidated Cement Corp., Chicago.
Cowell P. C. Co., Cowell, Cal.
Crescent P. C. Co., Wampum, Pa.
Dewey P. C. Co., Kansas City, Mo.
Diamond P. C. Co., Cleveland, O.
Edison P. C. Co., N. Y.
Georgia Cement & Stone Co., Birmingham, Ala.

Giant P. C. Co., Philadelphia, Pa.
Glens Falls P. C. Co., Glens Falls, N.Y.
Golden State P. C. Co., Los Angeles, Cal.
Great West P. C. Co., Kans. C. Mo.
Hawkeye P. C. Co., Des Moines, Ia.
Hercules Cement Corp., Philadelphia.
Hermitage P. C. Co., Nashville, Tenn.
Huron P. C. Co., Detroit, Mich.
Indiana P. C. Co., Indianapolis, Ind.
International Cement Corp., N. Y.
International P. C. Co., Ltd., Spokane, Wash.

Kansas P. C. Co., Kansas City, Mo.
Knickerbocker P. C. Co., Inc., Albany, N. Y.
Kosmos P. C. Co., Louisville, Ky.
La Tolteca Compania de Cemento Portland, Mexico City, Mex.
Lawrence Cement Co., New York.
Lehigh P. C. Co., Allentown, Pa.
Louisiana P. C. Co., New Orleans.
Louisville Cement Co., Louisville, Ky.
Manitowoc P. C. Co., Manitowoc, Wis.
Marlboro Cement Co., Edmonton, Can.
Marquette Cement Mfg. Co., Chicago.
Missouri P. C. Co., St. Louis, Mo.
Monarch Cement Co., Humboldt, Kans.
Monolith P. C. Co., Los Angeles, Cal.
National Cement Co., Birmingham, Ala.
Nazareth Cement Co., Nazareth, Pa.
Nebraska Cement Co., Denver, Colo.
Newago P. C. Co., Newago, Mich.
New Egyptian P. C. Co., Detroit.
North Amer. Cement Corp., Albany, N. Y.
Northwestern States P. C. Co., Mason City, Ia.

Oklahoma P. C. Co., Denver.
Olympic P. C. Co., Ltd., Seattle.
Oregon P. C. Co., Portland, Ore.
Pacific P. C. Co., San Francisco.
Peerless P. C. Co., Detroit, Mich.
Peninsular P. C. Co., Cement City, Mich.
Penn-Allen Cement Co., Nazareth, Pa.
Petokey P. C. Co., Petokey, Mich.
Phoenix P. C. Co., Philadelphia.
Pzh. Plate Glass Co., Zanesville, O.

P. C. Co. of Utah, Salt Lake City.
Pyramid P. C. Co., Des Moines.
Riverside P. C. Co., Los Angeles.
St. Marys Cement Co., Toronto, Can.
San Antonio P. C. Co., San Antonio.
Sandusky Cement Co., Cleveland, O.
Santa Cruz P. C. Co., San Francisco.
Signal Mountain P. C. Co., Chatto, Tenn.
Southern States P. C. Co., Rockport, Ga.
Southwest'n P. C. Co., Los Angeles, Cal.

Standard P. C. Co., Cleveland.
Sun P. C. Co., Portland, Ore.
Superior P. C. Co., Seattle, Wash.
Texas P. C. Co., Dallas, Tex.
Three Forks P. C. Co., Denver, Colo.
Tidewater P. C. Co., Baltimore, Md.
Trinity P. C. Co., Dallas, Tex.
Union P. C. Co., Denver, Colo.
U. S. P. C. Co., Denver, Colo.
Universal P. C. Co., Chicago.
Utah Idaho Cement Co., Ogden, Utah.
Virginia P. C. Corp., Norfolk.
Vulcanite P. C. Co., Philadelphia.
Wabash P. C. Co., Detroit.
Warrior Cement Corp., Chatto, Tenn.
Wellston Iron Furnace Co., Jackson, O.
Wolverine P. C. Co., Coldwater, Mich.
Wyandotte P. C. Co., Detroit.

CEMENT BLOCK MACHINES

*Cement Block Machy. Co., Newark, N.J.
Abrams Cement Tool Co., Detroit.

CEMENT GUNS

*Cement Gun Co., Allentown, Pa.

CEMENT INSPECTION (See Inspecting Laboratories)

CEMENT TOOLS

Abrams Cement Tool Co., Detroit.

CENTRIFUGAL PUMPS (See Pumps, Centrifugal)

CHAINS

*Chain Belt Co., Milwaukee, Wis.
*Link-Belt Co., Chicago.
Amer. Chain Co., Inc., Bridgeport, Conn.
Columbus McKinnon Chain Co., Columbus, O.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Jeffrey Mfg. Co., Columbus, O.
U. S. Chain & Forge Co., Pittsburgh, Pa.
Webster Mfg. Co., Chicago.
Weller Mfg. Co., Chicago.

CHIMNEYS, CONCRETE

Heine Chimney Co., Chicago.
Rust Engineering Co., Pittsburgh, Pa.
Webber Chimney Co., Chicago.

CHIMNEYS, RADIAL BRICK

Amer. Chimney Corp., N. Y.
Continental Chimney Co. of Chi., Chicago
Alphons Custodis Chimney Const. Co., N.Y.
Heine Chimney Co., Chicago.
H. R. Heinicke, Inc., Indianapolis, Ind.
M. W. Kellogg & Co., N. Y.
Rust Eng. Co., Pittsburgh, Pa.

CHIMNEYS, STEEL (See Stacks, Steel)

CHLORINATORS

*Wallace & Tiernan Co., Inc., Newark, N. J.
Paradon Eng. Co., Arlington, N. J.

CHLORINE LIQUID

(See Liquid Chlorine)

CHUTES, CONCRETE

*Insley Mfg. Co., Indianapolis, Ind.
*Lakewood Eng. Co., Cleveland, O.
*Ransome Conc. Mch'y. Co., Dunellen, N.J.

CLAY DIGGERS, PNEUMATIC

*Gardner-Denver Co., Denver, Col.
*Sullivan Machy Co., Chicago
Chicago Pneumatic Tool Co., New York
Ingersoll-Rand Co., New York

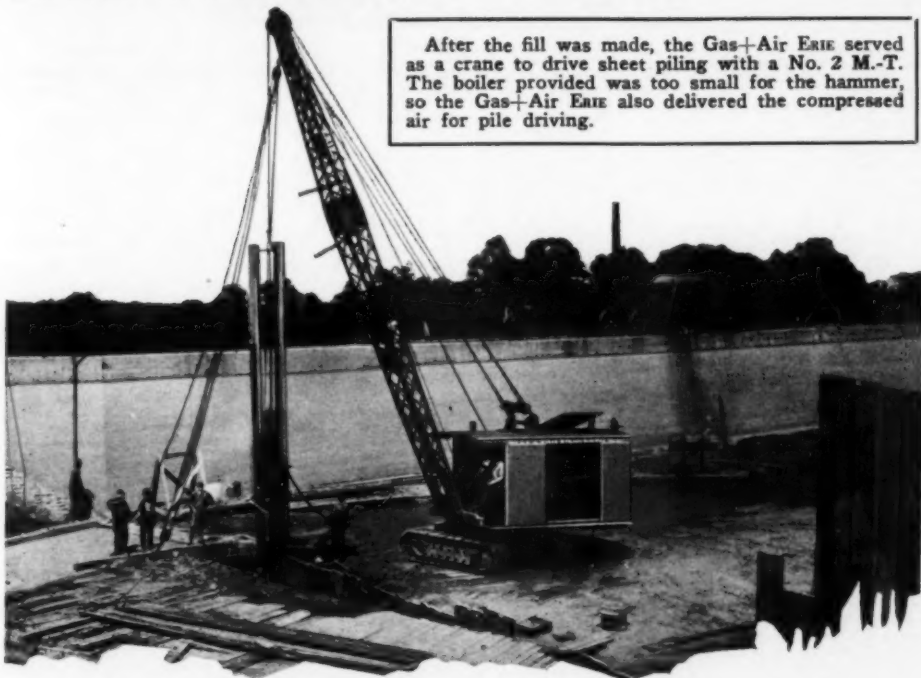
CLAY PIPE

(See Pipe, Vittrified Clay)

If you find any errors or omissions in this Where to Purchase list, please send corrections to

CONTRACTORS AND ENGINEERS MONTHLY

After the fill was made, the Gas+Air ERIE served as a crane to drive sheet piling with a No. 2 M.-T. The boiler provided was too small for the hammer, so the Gas+Air ERIE also delivered the compressed air for pile driving.



Gas+Air ERIE working 24 hours a day, 10 days continuous running---to repair the Barge Canal

A break in the sidewall of the N. Y. State Barge Canal—flood spreading ruin to property, drowning livestock. Quick action needed!

W. J. Gallagher, of Medina worked his Gas+Air ERIE three full 8-hour shifts, for 10 days continuously, without a minute's delay.

Some real yardage!

Mr. Gallagher says they loaded three 5-ton trucks in two minutes—as high as 210 truck loads in a shift. "You ought to see this Gas+Air ERIE in action," writes Mr. Gallagher—"It's a wonder, and its work has been praised by shovel critics from all parts of New York State."

State officials feel that the Gas+Air

ERIE moved as much material as two other machines on this job combined. Col. F. S. Green, N. Y. State Supt. of Public Works, said: "This Gas+Air ERIE has given one of the finest demonstrations I have ever seen. Unquestionably it has moved more dirt than any other machine on the job."

ERIE STEAM SHOVEL CO., Erie, Pa., U. S. A.

Branch Offices: Boston, New York, Philadelphia, Atlanta, Pittsburgh, Buffalo, Detroit, Chicago
Representatives throughout the U. S. A.

GAS+AIR ERIE^{and steam} DREADNAUGHT
SHOVELS, CRANES, DRAGLINES, ETC.

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

Where to Purchase

CLIPS, WIRE ROPES

- *Amer. Steel & Wire Co., Chicago
- *Amer. Hoist & Derrick Co., St. Paul, Minn.
- *Fischer & Hayes Rope & Steel Co., Chicago
- *Hazard Mfg. Co., Wilkesbarre, Pa.
- *Thos. Laughlin Co., Portland, Me.
- *Marion Malleable Ir. Wks., Marion, Ind.
- *C. M. Mockbee & Co., Cincinnati, O.
- *John A. Roebeling Sons Co., Trenton, N.J.
- *Upson-Walton Co., Cleveland, O.

CLUTCHES

- *Link-Belt Co., Chicago
- *Waukesha Motor Co., Waukesha, Wis.
- *Twin Disc Clutch Co., Racine, Wis.

COAL AND ORE CONVEYING MCHY.

- *Barber-Greene Co., Aurora, Ill.
- *Chain Belt Co., Milwaukee, Wis.
- *Chicago Automatic Conv. Co., Chicago
- *Good Roads Mch. Co., Kennett Sq., Pa.
- *Geo. Haiss Mfg. Co., N. Y.
- *Link-Belt Co., Chicago
- *Mead-Morrison Mfg. Co., E. Boston, Mass.
- *Austin Mfg. Co., Chicago
- *C. O. Bartlett & Snow Co., Cleveland, O.
- *Brown Hoisting Mch. Co., Cleveland, O.
- *Fairfield Eng. Co., Marion, O.
- *Gifford-Wood Co., Hudson, N. Y.
- *G. W. Hunt Co., Inc., W. New Brighton, N. Y.
- *Jeffrey Mfg. Co., Columbus, O.
- *Lidgerwood Mfg. Co., N. Y.
- *Portable Machy. Co., Clifton, N. J.
- *Robins Conv. Belt Co., N. Y.
- *Jas. B. Seaverns Co., Batavia, Ill.
- *Webster Mfg. Co., Chicago
- *Weller Mfg. Co., Chicago

COCKS, GUBS AND CORPORATION

- *Union Wtr. Mtr. Co., Worcester, Mass.
- *Chapman Valve Mfg. Co., Indian Orchard, Mass.
- *Glauber Brass Mfg. Co., Cleveland, O.
- *Haydenville Co., Haydenville, Mass.
- *Hays Mfg. Co., Erie, Pa.
- *Mueller Co., Decatur, Ill.

COLLAPSIBLE HORSES

- *Taylor Collapsible Horse Co., Chicago

COLUMB CLAMPS

- *Hawley Mfg. Co., Chicago
- *Emley Mfg. Co., Indianapolis, Ind.
- *Sterling Wheelbarrow Co., Milwaukee
- *Ellis & Ford Mfg. Co., Detroit, Mich.
- *W. A. Kuhlman & Co., Toledo, O.
- *M. & M. Form Clamp Co., Minneapolis
- *The O. D. G. Co., Owensboro, Ky.
- *Victor L. Phillips Co., Kansas City, Mo.
- *H. W. Ross Co., Cincinnati
- *Symons Clamp & Mfg. Co., Chicago
- *Universal Form Clamp Co., Chicago

COMPRESSORS, AIR (See Air Compressors)

CONCRETE BLOCK MACHINES (See Cement Block Machines)

CONCRETE CRIBBING

- *R-O Prod. Co., Cleveland

CONCRETE FLOOR HARDENER

- *Anti-Hydro Waterproofing Co., Newark, N. J.

- *Enslin Chemical Co., Cleveland
- *General Chemical Co., N. Y.
- *Gensfro Steel Co., Youngstown, O.
- *Granite Corp., N. Y.
- *A. C. Horn Co., L. I. City, N. Y.
- *Master Builders Co., Cleveland, O.
- *L. Sonneborn Sons, Inc., N. Y.
- *Trucon Laboratories, Detroit

CONCRETE HEATERS

- *Acroli Burner Co., West New York, N.J.
- *Lakewood Bros., Cincinnati
- *Alcor, Milburn Co., Baltimore, Md.
- *Chassee Oil Burner Co., Elkhart, Ind.
- *Mauck Mfg. Co., Brooklyn, N. Y.

CONCRETE MIXERS

- *Amer. Cem. Mch. Co., Inc., Keokuk, Ia.
- *Atlas Eng. Co., Milwaukee
- *Cement Block Machy. Co., Newark, N.J.

- *Chain Belt Co., Milwaukee
- *Cook Motor Co., Delaware, O.
- *Jaeger Mach. Co., Columbus, O.
- *Koehring Co., Milwaukee, Wis.
- *Lakewood Eng. Co., Cleveland, O.
- *Lansing Co., Lansing, Mich.
- *John Lauson Mfg. Co., New Halstein, Wis.
- *Ransome Con. Mch. Co., Dunellen, N.J.
- *T. L. Smith Co., Milwaukee
- *Anchor Mfg. Co., Chicago
- *Archer Iron Wks., Chicago
- *Badger Con. Mixer Co., Milwaukee
- *Construction Mch. Co., Waterloo, Ia.
- *J. B. Foote Fdry. Co., Fredericktown, O.
- *Gray Iron Fdry Co., Reading, Pa.
- *Judy Mfg. Co., Centerville, Ia.
- *Knickerbocker Co., Jackson, Mich.
- *Kiel Mach. Co., Kiel, Wis.
- *Kwik-Mix Concrete Mixer Co., Port Washington, Wis.
- *Leach Co., Oshkosh, Wis.
- *Marsh-Capron Co., Chicago
- *Mixermobile Co., Milwaukee
- *Orr & Sembower, Reading, Pa.
- *Raber & Lang Mfg. Co., Kendallville, Ind.
- *Remmel Mfg. Co., Kewaskum, Wis.
- *Republic Ir. Wks., Tecumseh, Mich.
- *Standard Scale & Sup. Corp., Pittsburgh

CONCRETE PAVERS

- *Jaeger Mach. Co., Columbus, O.
- *Koehring Co., Milwaukee
- *Lakewood Eng. Co., Cleveland
- *Ransome Con. Mch. Co., Dunellen, N.J.
- *T. L. Smith Co., Milwaukee
- *Foote Co., Nunda, N. Y.

CONCRETE PILING (See Piling)

CONCRETE PIPE (See Pipe, Concrete)

CONCRETE REINFORCEMENT

- *American Steel & Wire Co., Chicago
- *Trucon Steel Co., Youngstown, O.
- *Bethlehem Steel Co., Bethlehem, Pa.
- *Carnegie Steel Co., Pittsburgh, Pa.
- *Concrete Steel Co., N. Y.
- *Consolidated Exp. Metal Co., Wheeling, W. Va.
- *Electric Welding Co., Pittsburgh, Pa.
- *Ft. Pitt Bridge Wks., Pittsburgh, Pa.
- *Gensfro Steel Co., Youngstown, O.
- *Inland Steel Co., Chicago
- *Kalman Steel Co., Chicago
- *Laclede Steel Co., St. Louis, Mo.
- *National Steel Fabric Co., Pittsburgh
- *Republ. Ir. & Sbl. Co., Youngstown, O.
- *J. T. Ryerson & Son, Chicago
- *Wickwire-Spencer Steel Co., N. Y.
- *Youngstown Pressed Steel Co., Warren, O.

CONCRETE ROAD FINISHERS

- *Heltzel Sbl. Form & Iron Co., Warren, O.
- *A. W. French & Co., Chicago
- *Lakewood Eng. Co., Cleveland, O.

CONCRETE SURFACING MACHINES

- *Concrete Surfacing Machy. Co., Cincinnati, O.
- *Ingersoll-Rand Co., New York

CONCRETE TOOLS

- *The Dallett Co., Philadelphia

CONDENSERS

- *Allis-Chalmers Mfg. Co., Milwaukee
- *Ingersoll-Rand Co., N. Y.
- *Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
- *Wheeler Cond. & Eng. Co., Cateret, N.J.
- *Worthington Pump & Machy Corp., N.Y.

CONDUIT ROPS

- *F. Bissell Co., Toledo, O.
- *Turbine Sewer Mch. Co., Milwaukee
- *Waldo Bros. & Bond Co., Boston

CONDUITS, UNDERGROUND

- *Amer. Vitr. Products Co., Akron, O.
- *Johns-Mansville, Inc., N. Y.
- *National Fireproofing Co., N. Y.

- *Ric-wil Co., Cleveland

CONTRACTORS' EQUIPMENT DEALERS (See Pages 135 to 174)

CONVEYORS, BELT

- *Atlas Eng. Co., Milwaukee
- *Austin-Western Bd. Mch. Co., Chicago
- *Barber-Greene Co., Aurora, Ill.
- *Chain-Belt Co., Chicago
- *Chicago Automatic Conv. Co., Chicago
- *Gallion Ir. Wks. & Mfg. Co., Gallion, O.
- *Good Rds. Mch. Co., Kennett Sq., Pa.
- *Geo. Haiss Mfg. Co., N. Y.
- *Jos. Honhorst Co., Cincinnati
- *Link-Belt Co., Chicago
- *Northern Conveyor Co., Janesville, Wis.
- *Russell Grader Mfg. Co., Minneapolis
- *Smith Eng. Wks., Milwaukee
- *Austin Mfg. Co., Chicago
- *C. O. Bartlett & Snow Co., Cleveland
- *Brown Hoisting Machy. Co., Cleveland
- *Fairfield Eng. Co., Marion, Ohio
- *Gifford Wood Co., Hudson, N. Y.
- *Jeffrey Mfg. Co., Columbus, O.
- *New Holland Mch. Co., N. Holland, Pa.
- *Portable Machinery Co., Clifton, N. J.
- *Samuel Olson & Co., Chicago
- *Robins Conv. Belt Co., N. Y.
- *Jas. B. Seaverns Co., Batavia, Ill.
- *Standard Conv. Co., No. St. Paul, Minn.
- *Stephens-Adamson Mfg. Co., Aurora, Ill.
- *Universal Crusher Co., Cedar Rapids, Ia.
- *Webster Mfg. Co., Chicago
- *Weller Mfg. Co., Chicago

CONVEYORS, BUCKET

- *Atlas Eng. Co., Milwaukee
- *Chain Belt Co., Milwaukee
- *Chicago Automatic Conv. Co., Chicago
- *Good Roads Machy. Co., Kennett Sq., Pa.
- *Geo. Haiss Mfg. Co., N. Y.
- *Jos. Honhorst Co., Cincinnati, O.
- *Link-Belt Co., Chicago
- *Mead-Morrison Mfg. Co., E. Boston, Mass.
- *Russell Grader Mfg. Co., Minneapolis
- *Austin Mfg. Co., Chicago
- *C. O. Bartlett & Snow Co., Cleveland, O.
- *Brown Hoisting Machy. Co., Cleveland, O.
- *H. W. Caldwell & Son, Chicago
- *Fairfield Eng. Co., Marion, O.
- *Gifford Wood Co., Hudson, N. Y.
- *Godfrey Conv. Co., Elkhart, Ind.
- *Guarantee Constn. Co., N. Y.
- *Jeffrey Mfg. Co., Columbus, O.
- *New Holland Mch. Co., N. Holland, Pa.
- *Samuel Olson & Co., Chicago
- *Republ. Rubber Co., Youngstown, O.
- *Robins Conv. Belt Co., N. Y.
- *Jas. B. Seaverns Co., Batavia, Ill.
- *Stephens Adamson Mfg. Co., Aurora, Ill.
- *Universal Crusher Co., Cedar Rapids, Ia.
- *Webster Mfg. Co., Chicago
- *Weller Mfg. Co., Chicago

CONVEYORS, GRAVITY

- *Lamson Co., Syracuse, N. Y.
- *Logan Co., Louisville, Ky.
- *Mathews Conveyor Co., Elwood City, Pa.
- *Standard Conv. Co., No. St. Paul, Minn.

COUPLINGS, HOSE

- *Hardsocg Wonder Dr. Co., Ottumwa, Ia.
- *Cleveland Pneum. Tool Co., Cleveland, O.
- *Gilman Mfg. Co., East Boston, Mass.
- *Ingersoll-Rand Co., N. Y.
- *W. H. Keller, Inc., Grand Haven, Mich.
- *Malconroy Co., Philadelphia

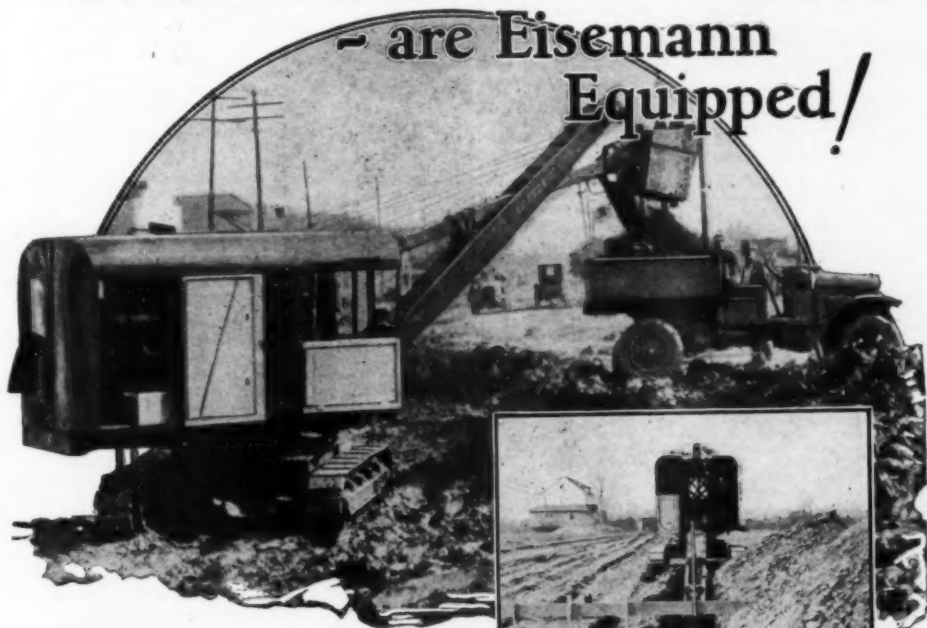
CRANES, CRAWLER

- *Erie Steam Shovel Co., Erie, Pa.
- *Link-Belt Co., Chicago
- *Mead-Morrison Mfg. Co., Boston
- *Orion Crane & Shovel Co., Chicago
- *Star Drilling Mach. Co., Akron, O.
- *Thew Shovel Co., Lorain, Ohio
- *Austin Machy. Corp., Muskegon, Mich.
- *Byers Mach. Co., Ravenna, O.
- *McMyler Interstate Co., Cleveland
- *Osquod Co., Marion, Ohio
- *Universal Crane Co., Cleveland

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*

SPEEDER → SHOVELS

— are Eisemann
Equipped!



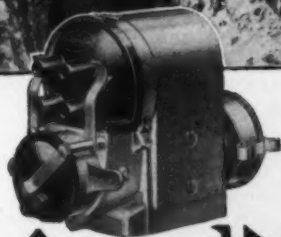
SPEEDER Light-Weight "Shovel-Cranes" are designed for economical operation—to cut the costs, and save the contractor's money.

And, economical operation is the outstanding characteristic of the ignition system on these excavators. For Eisemann Magnetos never fail to function—and cause no expensive delays or shut-downs.

Speeder-owners enjoy Eisemann-economy—and pocket the saving.

EISEMANN MAGNETO CORPORATION

165 Broadway, New York
DETROIT SAN FRANCISCO CHICAGO



EISEMANN

ELECTRICAL EQUIPMENT

Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.

Where to Purchase

CRANES, LOCOMOTIVE

*Bay City Dredge Wks., Bay City, Mich.
 *Erie Steam Shovel Co., Erie, Pa.
 *Koeberling Co., Milwaukee.
 *Link-Belt Co., Chicago.
 *Mead-Morrison Mfg. Co., Boston.
 *Orton Crane & Shovel Co., Chicago.
 *Parsons Co., Newton, Iowa.
 *Speeder Machy. Corp., Cedar Rapids, Ia.
 *Thew Shovel Co., Lorain, O.
 Amer. Hat. & Derrick Co., St. Paul, Minn.

Brown Hoisting Machy. Co., Cleveland.
 Browning Crane Co., Cleveland, O.
 Davenport Loe. Wks., Davenport, Ia.
 Industrial Wks., Bay City, Mich.
 Loe. Crane Co. of Amer., Champaign, Ill.
 Marion Steam Shovel Co., Marion, O.
 McMyler Interstate Co., Cleveland, O.
 Moore Speedcrane Co., Chicago.
 Northwest Eng. Wks., Chicago.
 Ohio Loe. Crane Co., Bucyrus, O.
 Jas. B. Seavers Co., Batavia, Ill.
 U. S. Crane Co., Chicago.

CRANES, ONE-TON

*Whitehead & Sales Co., Detroit, Mich.
 Hughes-Keean Co., Mansfield, O.
 Otis Eng. Co., New York.

CRANES, OVERHEAD TRAVELING

Alliance Mach. Co., Alliance, O.
 Chesapeake Iron Wks., Baltimore, Md.
 Chisholm-Moore Wks., Cleveland.
 Curtis Pn. Mach. Co., St. Louis.
 Harnischfeger Corp., Milwaukee, Wis.
 Milwaukee Elec. Crane Co., Milwaukee.
 Morgan Eng. Co., Alliance, O.
 Northern Eng. Wks., Detroit, Mich.
 Shaw Crane Wks., Muskegon, Mich.
 Shepard Elec. Cr. & Hst. Co., Montour Falls, N. Y.
 Toledo Crane Co., Bucyrus, O.
 Whiting Fdry. & Equip. Co., Harvey, Ill.

CRANES, TRUCK

*Ersted Mch. Mfg. Co., Portland, Ore.
 *Orton Crane & Shovel Co., Chicago.
 Atia Corp., New York.
 Bay City Fdry. & Mach. Co., Bay City, Mich.
 Browning Crane Co., Cleveland.
 Byers Mach. Co., Ravenna, O.
 Harnischfeger Corp., Milwaukee, Wis.
 Universal Crane Co., Cleveland.

CRANES, WRECKING

Bucyrus Co., So. Milwaukee, Wis.
 Industrial Wks., Bay City, Mich.

CRAWLER ATTACHMENTS

*Geo. Hains Mfg. Co., New York.
 *Link-Belt Co., Chicago.
 *Trackson Co., Milwaukee, Wis.
 Belle City Mfg. Co., Racine, Wis.

CREOSOTED BLOCKS, TIMBER, ETC.

Amer. Creos. Co., Inc., Louisville, Ky.
 Amer. Creos. Wks. Inc., N. Orleans, La.
 Carter Bloxsonend Flooring Co., K. City, Mo.
 Colonial Cre. Co., Inc., Louisville, Ky.
 Compressed Wood Preserving Co., Cincinnati, O.
 Creos. Materials Co., N. Orleans, La.
 Georgia Creos. Co., Louisville, Ky.
 Jennison-Wright Co., Toledo, O.
 Leag Ball Lumber Co., Kansas City, Mo.
 Midland Creos. Co., Granite City, Ill.
 Pensacola Creosoting Co., Pensacola, Fla.
 Republic Creos. Co., Indianapolis, Ind.
 Southern Wood Pres. Co., Atlanta, Ga.
 Wyckoff Pipe & Creos. Co., N. Y.

CREOSOTING AND CREOSOTING OILS

*Barrett Co., N. Y.
 Amer. Creos. Wks. Inc., N. Orleans, La.
 Amer. Tar Prod. Co., Pittsburgh, Pa.
 Jennison-Wright Co., Toledo, O.
 Southern Creos. Co., Silead, Ia.
 Southern Pavg. Const. Co., Chattanooga.
 Wyckoff Pipe & Creos. Co., N. Y.

CRUSHERS, ROCK

*Acme Rd. Machy. Co., Frankfort, N. Y.
 *Austin-Western Rd. Mach. Co., Chicago.
 *Gallion Iron Wks. & Mfg. Co., Gallion, O.
 *Good Bds. Machy. Co., Kennett Sq., Pa.
 *Russell Grader Mfg. Co., Minneapolis.
 *Smith Eng. Wks., Milwaukee.
 Austin Mfg. Co., Chicago.
 New Holland Mach. Co., New Holland, Pa.
 Sturtevant Mill Co., Boston.
 Universal Crusher Co., Cedar Rapids, Ia.
 Universal Rd. Machy. Co., Kingston, N.Y.

CULVERTS, CAST IRON

*Gallion Ir. Wks. & Mfg. Co., Gallion, O.
 *U. S. C. I. Pipe & Fdry. Co., Burlington, N. J.
 Amer. C. I. Pipe Co., Birmingham, Ala.
 Beach Mfg. Co., Charlotte, Mich.
 Gilbert Mfg. Co., Aberdeen, S. D.
 R. D. Wood & Co., Philadelphia.

CULVERTS, CORRUGATED METAL

*Austin-Western Rd. Mach. Co., Chicago.
 *Gallion Iron Wks. & Mfg. Co., Gallion, O.
 *Good Bds. Mach. Co., Kennett Sq., Pa.
 Austin Mfg. Co., Chicago.
 Bark River Bridge & Culv. Co., Bark River, Mich.
 Beach Mfg. Co., Charlotte, Mich.
 Berger Mfg. Co., Jacksonville, Fla.
 Boardman Co., Okla. City, Okla.
 Burnham Mfg. Co., Woods Cross, Utah.
 Calif. Corr. Culv. Co., W. Berkeley, Cal.
 Canada Ingot Ir. Co., Ltd., Guelph, Ont.
 Canton Culv. & Silo Co., Canton, O.
 Coast Culv. & Flume Co., Portland, Ore.
 Corr. Culv. Co., Moberly, Mo.
 Dixie Culv. & Metal Co., Atlanta, Ga.
 Dixie Culv. Mfg. Co., Little Rock, Ark.
 Gilbert Mfg. Co., Aberdeen, S. D.
 R. Hardesty Mfg. Co., Denver, Colo.
 Highway Prod. & Mfg. Co., Elmira, N.Y.
 Ind. Corr. Culv. Co., Mason City, Ia.
 Iowa Pure Ir. Co., Des Moines, Ia.
 Klauer Mfg. Co., Dubuque, Ia.
 Lyle Culv. & Rd. Equip. Co., Minneapolis, Minn.
 Md. Culv. & Metal Co., Baltimore.
 N. E. Metal Culv. Co., Palmer, Mass.
 Nebraska Culv. & Mfg. Co., Wahoo, Neb.
 Newport Culvert Co., Newport, Ky.
 North East Metal Culv. Co., Nashua, N.H.
 Northfield Ir. Co., Northfield, Minn.
 Northwestern Sheet & Ir. Wks., Wapeton, N. D.
 Ohio Corr. Culv. Co., Middletown, O.
 W. Q. O'Neill Co., Crawfordsville, Ind.
 Road Supply & Metal Co., Topeka, Kan.
 Sioux Falls Metal Culv. Co., Sioux Falls, S. D.
 So. Metal Culv. Co., Salisbury, N. C.
 Spokane Culv. & Tank Co., Spokane.
 Tenn. Metal Culv. Co., Nashville.
 U. S. Br. & Culv. Co., Bay City, Mich.
 Va. Metal Mfg. Co., Roanoke, Va.
 Western Metal Mfg. Co., Houston, Tex.
 Wheeling Corr. Co., Wheeling, W. Va.
 Wyatt Metal & Blr. Wks., Dallas, Tex.

CULVERT FORMS
 *Blaw-Knox Co., Pittsburgh, Pa.
 Concrete Form Co., Inc., Syracuse, N.Y.
 Northfield Iron Co., Northfield, Minn.

CURE BOXES

Casey-Hedges Co., Chattanooga, Tenn.
 H. W. Clark Co., Mattoon, Ill.
 J. B. Clow & Sons, Chicago.
 Madison Fdry. Co., Cleveland, O.
 Mueller Co., Decatur, Ill.

CURE, CUTTER AND BASE FORMS

(See Forms, Concrete)

CURE GUARDS, STEEL

W. S. Godwin Co., Baltimore.

CURE, STEEL PROTECTED

*Truscon Steel Co., Youngstown, O.
 Concrete Steel Co., N. Y.

CURING OF CONCRETE

*Dow Chemical Co., Midland, Mich.
 *Solway Sales Corp., N. Y.

CUTTERS, PIPE, HAND

Armstrong Mfg. Co., Bridgeport, Ct.
 Barnes Tool Co., New Haven, Ct.
 Ellia & Ford Mfg. Co., Detroit.
 Erie Tool Works, Erie, Pa.
 Greenfield Tap & Die Corp., Greenfield, Mass.
 Oswego Tool Co., Oswego, N. Y.
 Reed Mfg. Co., Erie, Pa.
 Walworth Mfg. Co., Boston.

CUTTERS, ROD AND WIRE

*Koeberling Co., Milwaukee, Wis.
 Buffalo Forge Co., Buffalo, N. Y.
 Carous Mfg. Co., Sterling, Ill.
 C. D. Edwards Mfg. Co., Albert Lee, Minn.
 Helwig Mfg. Co., St. Paul, Minn.
 M. & M. Wire Clamp Co., Minneapolis.
 Worthington Pump & Machy. Corp., N.Y.

CUTTING EDGES

*Russell Grader Mfg. Co., Minneapolis.
 J. D. Adams & Co., Indianapolis, Ind.
 Shunk Mfg. Co., Bucyrus, O.

CUTTING AND WELDING APPARATUS

(See Welding Apparatus)

CYLINDER HEADS, RICARDO

*Waukesha Motor Co., Waukesha, Wis.

DERRICKS, GUY AND STIFF-LEG

*Clyde Ir. Wks. Sales Co., Duluth, Minn.
 *Dobbie Fdry. & Mach. Co., Niagara Falls, N. Y.
 *S. Flory Mfg. Co., Bangor, Pa.
 *Inaley Mfg. Co., Indianapolis, Ind.
 *Mundy Sales Corp., N. Y.
 *Saagen Derrick Co., Chicago.
 *Universal Htg. Machy. Corp., Buffalo.
 Amer. Hat. & Derrick Co., St. Paul, Minn.
 John T. Horton Co., N. Y.
 Lakeside Bridge & Steel Co., N. Milwaukee, Wis.
 Lidgerwood Mfg. Co., N. Y.
 National Htg. Eng. Co., Harrison, N. J.
 Street Bros. Mach. Wks., Chattanooga.
 Superior Iron Wks., Superior, Wis.

DERRICKS, PIPE LAYING

*Dobbie Fdry. & Mach. Co., Niagara Falls.
 Lidgerwood Mfg. Co., N. Y.
 Street Bros. Mach. Wks., Chattanooga.

DERRICKS, REVOLVING

*Clyde Ir. Wks. Sales Co., Duluth, Minn.
 *Dobbie Fdry. & Mach. Co., Niagara Falls.
 Street Bros. Mach. Wks., Chattanooga.

DERRICKS, STEEL

*Clyde Ir. Wks. Sales Co., Duluth, Minn.
 *Dobbie Fdry. & Mach. Co., Niagara Falls.
 *Inaley Mfg. Co., Indianapolis, Ind.
 Amer. Hat. & Derrick Co., St. Paul.
 Hayward Co., N. Y.
 Street Bros. Mach. Wks., Chattanooga.
 Taylor Port. St. Derrick Co., Chicago.

DERRICKS, STEEL PORTABLE

*Clyde Ir. Wks. Sales Co., Duluth, Minn.
 *Dobbie Fdry. & Mach. Co., Niagara Falls.
 Amer. Hat. & Derrick Co., St. Paul.
 Atia Corp., New York.
 Lidgerwood Mfg. Co., N. Y.
 Street Bros. Mach. Wks., Chattanooga.

DERRICKS, TRAVELING

*Bay City Dredge Wks., Bay City, Mich.
 *Clyde Ir. Wks. Sales Co., Duluth, Minn.
 *Dobbie Fdry. & Mach. Co., Niagara Falls.
 *Orten Crane & Shovel Co., Chicago.
 Amer. Hat. & Derrick Co., St. Paul.
 Nat'l. Htg. Eng. Co., Harrison, N. J.
 Street Bros. Mach. Wks., Chattanooga.

DERRICK FITTINGS

*S. Flory Mfg. Co., Bangor, Pa.
 *Mundy Sales Corp., N. Y.
 Amer. Hat. & Derrick Co., St. Paul.
 Hayward Co., N. Y.
 Lidgerwood Mfg. Co., N. Y.
 Street Bros. Mach. Wks., Chattanooga.

If you find any errors or omissions in this Where to Purchase list, please send corrections to

CONTRACTORS AND ENGINEERS MONTHLY

The finest product of our 25 years' experience~

Here is the ideal bucket for contractors. It has weight enough to bury itself in the material, spread enough to collect a full bucket load and speed enough to insure at least three trips a minute . . . a bucket suitable for locomotive crane or derrick operation.

The New ORTON Clamshell Bucket has flat braced back arms, straight lead cable sheaves, bronze-bushed interlocking hinges, Alemite-Zerk Lubricating System and many other improvements in design and construction.

This New Bucket is the finest product of our twenty-five years' experience. Its principles of construction have been proven sound and a long list of satisfied users vouch for its dependability. Contractors everywhere are using this New ORTON Bucket.

We shall be glad to send complete information, including photographs, descriptive literature and price of any size bucket we manufacture, to anyone interested. The ORTON Clamshell is built in sizes from $\frac{1}{2}$ to 5 yards.



This is the New ORTON $\frac{1}{4}$ -yard clamshell bucket. Note the new flat braced back arms, the interlocking hinges and its sturdy appearance in general. It is especially suitable for cleaning up cars because it has straight sides and back. Write now for our new folder describing it.

Cranes **ORTON** *Shovels*
 ORTON CRANE & SHOVEL COMPANY, 608 SO. DEARBORN ST., CHICAGO, ILL.

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

Where to Purchase

DIAPHRAGM PUMPING OUTFITS

*John Lanson Mfg. Co., New Helstein, Wis.

DIESEL ENGINES (See Engines, Oil)

DISTRIBUTORS, TAR AND ASPHALT

*Kinney Mfg. Co., Boston
E. D. Etnyre & Co., Oregon, Ill.
Municipal Supply Co., So. Bend, Ind.

DISTRIBUTING PLANTS, CONCRETE

*Lakewood Eng. Co., Cleveland.
*Imley Mfg. Co., Indianapolis, Ind.
*Hansome Conc. Mch. Co., Danellen, N.J.

DITCHING MACHINES (See Excavators)

DOORS AND SHUTTERS, STEEL ROLLING

Cornell Iron Wks., B'klyn., N. Y.
Kinnear Mfg. Co., Columbus, O.
Variety Fire Door Co., Chicago
J. G. Wilson Corp., N. Y.

DRAFTING MACHINES

Univ. Drafting Mach. Co., Cleveland, O.

DREDGES

*Ray City Dredge Wks., Ray City, Mich.
*Orton Crane & Shovel Co., Chicago.
Amer. Steel Dredge Co., Ft. Wayne, Ind.
Bucyrus Co., So. Milwaukee, Wis.
Elliott Mch. Corp., Baltimore
Hayward Co., N. Y.
Marion Steam Shovel Co., Marion, O.
Osgood Co., Marion, O.
J. B. Schofield's Sons Co., Macon, Ga.
Stockton Iron Wks., Stockton, Cal.
Street Bros. Mach. Wks., Chattanooga
Superior Iron Wks., Superior, Wis.

DREDGES, DIPPER

*Bay City Dredge Wks., Bay City, Mich.
*Link-Belt Co., Chicago.
Amer. Steel Dredge Co., Ft. Wayne, Ind.
Bucyrus Co., So. Milwaukee, Wis.
Marion Steam Shovel Co., Marion, O.
Osgood Co., Marion, O.

DREDGES, HYDRAULIC

Bucyrus Co., South Milwaukee, Wis.
Elliott Mch. Corp., Baltimore.
Marion Steam Shovel Co., Marion, O.
Morris Mach. Wks., Baldwinville, N.Y.

DREDGING MACHINERY

*S. Flory Mfg. Co., Bangor, Pa.
*Mundy Sales Corp., N. Y.
Lidgerwood Mfg. Co., N. Y.
Street Bros. Mach. Wks., Chattanooga.

DREDGING PUMPS AND ACCESSORIES

Erie Pump & Engine Wks., Medina, N.Y.
Ingersoll-Rand Co., N. Y.

DRILL STEEL SHARPENERS

(See Sharpeners)

DRILLS, CORE

*McKlerman-Terry Drill Co., N. Y.
*Sullivan Machy. Co., Chicago.
Ingersoll-Rand Co., N. Y.

DRILLS, ROCK

*Dallist Co., Philadelphia.
*Gardner-Denver Co., Denver, Col.
*Hardsocq Wonder Drill Co., Ottumwa, Ia.
*Sullivan Machy. Co., Chicago.
Chicago Pneum. Tool Co., N. Y.
Cleveland Pneum. Tool Co., Cleveland, O.
Cleveland Rock Drill Co., Cleveland, O.
Gilman Mfg. Co., E. Boston.
Helwig Mfg. Co., St. Paul, Minn.
Ingersoll-Rand Co., N. Y.
W. H. Keller, Inc., Grand Haven, Mich.
Wood Drill Wks., Paterson, N. J.

DRILLS FOR WELLS AND BLAST

HOLES (See Well Drilling Machy)

DRUMS, HOLDING

*Blaw-Knox Co., Pittsburgh, Pa.

*Clyde Ir. Wks. Sales Co., Duluth, Minn.

*Dobbie Fdry. & Mch. Co., Niagara Falls.
*Haltzel Steel Form & Ir. Co., Warren, O.
Hayward Co., N. Y.
Street Bros. Mach. Wks., Chattanooga.

DRYERS, ASPHALT AND CEMENT

Allis-Chalmers Mfg. Co., Milwaukee.
Amer. Blower Co., Detroit, Mich.
Atlas Dryer Co., Cleveland, O.
C. O. Bartlett & Snow Co., Cleveland, O.
F. D. Cammer & Son Co., Cleveland, O.
Mosher Mfg. Co., Chicago.
Ruggles-Coles Eng. Co., N. Y.

DRYERS, SAND AND GRAVEL

*Acroft Burner Co., West New York, N.J.
*Jos. Honhorst Co., Cincinnati, O.
*Littleford Bros., Cincinnati, O.
*Alex. Milburn Co., Baltimore, Md.
Amer. Process Co., N. Y.
C. O. Bartlett & Snow Co., Cleveland, O.
Chase & Lyman, Boston
Chassee Oil Burner Co., Elkhart, Ind.
Mosher Mfg. Co., Chicago.

DUMP BODIES FOR CONCRETE

Easton Car & Const. Co., Easton, Pa.
Lee Trailer & Body Co., Plymouth, Ind.

DUMP BODIES FOR MOTOR TRUCKS

*Hell Co., Milwaukee.
*Highway Trailer Co., Edgerton, Wis.
*Littleford Bros., Cincinnati, O.
*Mack Trucks, Inc., N. Y.
*Van Dorn Iron Wks. Co., Cleveland, O.
*Wood Hydr. Hoist & Body Co., Detroit.
Amer. Prod. & Trad. Co., Chicago.
Am. Truck & Body Co., Martinsville, Va.
Anthony Co., Streator, Ill.
Atlas Corp., New York.
Columbia Body Corp., Columbia, Pa.
Columbian St. Tank Co., Kansas City, Mo.
Detroit Trailer & Mach. Co., Detroit.
Detweiler Mfg. Co., Gallon, O.
Eagle Wagon Wks., Auburn, N. Y.
Easton Car & Const. Co., Easton, Pa.
Gallon All Steel Body Co., Gallon, O.
Griscorn-Russell Co., N. Y.
Herr Dump Car Mfg. Co., Coatesville, Pa.
Hughes-Keenan Co., Mansfield, O.
The Hug Co., Highland, Ill.
Jennings Aut. Dump Body, Roanoke, Va.
Lee Trailer & Body Co., Plymouth, Ind.
Mandt Body Co., Keokuk, Ia.
Marion Steel Body Co., Marion, O.
Martin-Ferry Corp., York, Pa.
N. Y. Central Ir. Wks., Hagerstown, Md.
Pechstein Iron Wks., Keokuk, Ia.
Stewart Iron Wks. Co., Cincinnati.

DUMP CARTS AND WAGONS, HORSE

*Acme Rd. Machy. Co., Frankfort, N. Y.
*Austin-Western Rd. Machy. Co., Chicago.
*Eagle Wagon Wks., Auburn, N. Y.
*Highway Trailer Co., Edgerton, Wis.
*La Plant-Cheate Mfg. Co., Cedar Rapids, Ia.

*Russell Grader Mfg. Co., Minneapolis.

Acme Wagon Co., Emigsville, Pa.
J. D. Adams & Co., Indianapolis.
Austin Mfg. Co., Chicago.
Bain Wagon Co., Kenosha, Wis.
Columbia Body Corp., Columbia, Pa.
Electric Wheel Co., Quincy, Ill.
Gilbert Mfg. Co., Aberdeen, S. D.
Hagy Wagon Co., Abingdon, Va.
G. H. Holzberg & Bro., Jeffersonville, Ind.
Little Red Wagon Co., Omaha, Neb.
Luedinghaus-Espenchied Wagon Co., St. Louis.
Rex-Watson Corp., Canastota, N. Y.
Stockland Rd. Machy. Co., Minneapolis.
Streich Bros., Oakshoah, Wis.
Thornhill Wagon Co., Lynchburg, Va.
Western Wheeled Scraper Co., Aurora, Ill.

DUMP WAGONS, (ALL STEEL), TRACTOR DRAWN

*Enclid Cr. & Hst. Co., Euclid Village, O.

*La Plant-Cheate Mfg. Co., Cedar Rapids, Iowa.

Lenhart Wagon Co., Minneapolis.

DYNAMITE (See Explosives)

EJECTORS, SEWAGE (See Sewage Ejectors)

ELECTRIC GENERATORS AND MOTORS

Louis Allis Co., Milwaukee.
Allis-Chalmers Mfg. Co., Milwaukee.
Crocker-Wheeler Co., Ampere, N. J.
Fairbanks, Morse & Co., Chicago.
General Elec. Co., Schenectady, N. Y.
Graybar Electric Co., New York.
Ideal Elec. & Mfg. Co., Mansfield, O.
Lincoln Elec. Co., Cleveland, O.
Robbins & Myers Co., Springfield, O.
Wagner Elec. Mfg. Co., St. Louis.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

ELECTRIC LAMPS

General Elec. Co., Schenectady, N. Y.
Westinghouse Lamp Co., N. Y.

ELECTRIC LIGHTING PLANTS

*Glimax Eng. Co., Clinton, Ia.
*Cook Motor Co., Delaware, O.
Allis-Chalmers Mfg. Co., Milwaukee.
Cushman Motor Wks., Lincoln, Neb.
Fairbanks, Morse & Co., Chicago.
Fuller & Johnson Mfg. Co., Madison, Wis.
General Elec. Co., Schenectady, N. Y.
Graybar Electric Co., New York.
Klausner Mfg. Co., Dubuque, Iowa.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

ELECTRIC TRANSFORMERS

Allis-Chalmers Mfg. Co., Milwaukee.
General Elec. Co., Schenectady, N. Y.
Kuhlman Elec. Co., Bay City, Mich.
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

ELECTRIC WIRES (See Wire)

ELEVATORS, BUCKET

*Atlas Eng. Co., Milwaukee.
*Austin-Western Rd. Machy. Co., Chicago.
*Chain Belt Co., Milwaukee, Wis.
*Good Edm. Machy. Co., Kennett Sq., Pa.
*Geo. Hais Mfg. Co., N. Y.
*Link-Belt Co., Chicago.
*Littleford Bros., Cincinnati.
*Russell Grader Mfg. Co., Minneapolis.
*Spears-Wells Machy. Co., Oakland, Cal.
Abrams Cement Tool Co., Detroit.
Austin Mfg. Co., Chicago.
C. O. Bartlett & Snow Co., Cleveland, O.
Brova Htg. Machy. Co., Cleveland, O.
Fairfield Eng. Co., Marion, Ohio.
Gifford-Wood Co., Hudson, N. Y.
Jeffrey Mfg. Co., Columbus, O.
New Holland Mch. Co., N. Holland, Pa.
Robins Conv. Belt Co., N. Y.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Univ. Rd. Machy. Co., Kingston, N. Y.
Webster Mfg. Co., Chicago.
Weller Mfg. Co., Chicago.
Worthington Pump & Mch. Corp., N.Y.

ELEVATORS, PASSENGER, FREIGHT, ETC.

Am. Elev. & Mach. Co., Louisville, Ky.
Atlantic Elev. Co., Inc., Philadelphia.
Bay State Elev. Co., Springfield, Mass.
Haughton Elev. & Mach. Co., Toledo, O.
Kaestner & Hecht Co., Chicago.
Llewellyn Ir. Wks., Los Angeles, Cal.
Montgomery Elev. Co., Moline, Ill.
Otis Elevator Co., N. Y.
C. Ridgway & Son Co., Coatesville, Pa.
A. B. See Elec. Elev. Co., N. Y.
Spindel Elev. Corp., Reading, Pa.
Warner Elev. Mfg. Co., Cincinnati.
Warsaw Elev. Co., Warsaw, N. Y.

ENGINE DREDGING

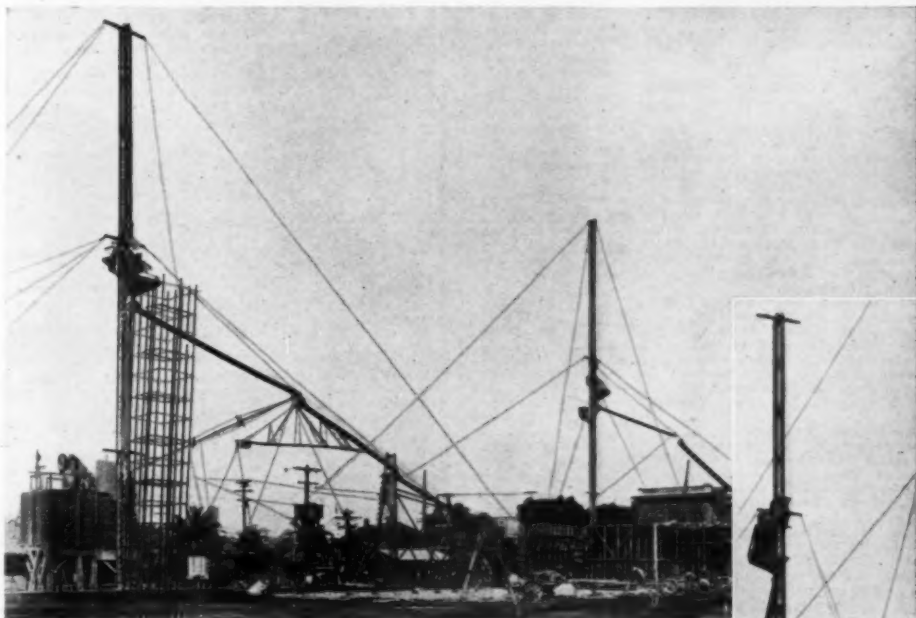
Murray Ir. Wks. Co., Burlington, Ia.

ENGINES, FORD REPLACEMENT

*Waukesha Motor Co., Waukesha, Wis.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*

INSLEY MAST HOIST • CONCRETE PLACING MATERIAL HANDLING • EQUIPMENT



From Coast to Coast

OVER on the east coast, for example, the Triest Contracting Company used four Insley Mast Hoists on the Elizabeth-Howland Hook Bridge job. Out in Los Angeles, Stone and Webster, Inc., used two of them on the White Motor Truck job. In between these two limits of the United States, in practically every large city and in many smaller ones, some progressive contractor is using an Insley Mast Hoist to place concrete in an important building, and in many places dozens of contractors are using them.

The Insley Mast Hoist, during the last two years, has attained nation-wide recognition as the best piece of concrete-placing equipment on the market, and is used by all classes of progressive contractors from the largest to the smallest. Why? Because it saves its first cost on labor in placing concrete, because it saves the cost of a wood tower every time it is set up, and because it is made of steel and is permanent equipment.

These are only three reasons. There are a dozen more just as good. Let us tell you about them.

INSLEY

MANUFACTURING
COMPANY - Indianapolis

546
ENGINEERS
AND
MANUFACTURERS

Yes—we would like you to mention the CONTRACTORS AND ENGINEERS MONTHLY.

Where to Purchase

ENGINES, GAS AND GASOLINE

- *Alamo Eng. Co., Hillsdale, Mich.
- *Caterpillar Tractor Co., San Leandro, Cal.
- *Climax Eng. Co., Clinton, Ia.
- *Continental Motors Corp., Muskegon, Mich.
- *Cook Motor Co., Delaware, O.
- *Domestic Eng. & Pump Co., Shippensburg, Pa.
- *Erted Mfg. Co., Portland, Ore.
- *Hercules Motors Corp., Canton, O.
- *F. Van Rossen Hoogendyk, New York.
- *John Lanson Mfg. Co., New Holstein, Wis.
- *Le Roi Co., Milwaukee.
- *Link-Belt Co., Chicago.
- *Novo Engine Co., Lansing, Mich.
- *Stover Mfg. & Eng. Co., Freeport, Ill.
- *Waukesha Motor Co., Waukesha, Wis.
- *Witte Engine Wks., Kansas City, Mo.
- *Allis-Chalmers Mfg. Co., Milwaukee.
- *Beaver Mfg. Co., Milwaukee, Wis.
- *Buda Co., Harvey, Ill.
- *Charter Gas Eng. Co., Sterling, Ill.
- *Chicago Pneum. Tool Co., N. Y.
- *Cushman Motor Wks., Lincoln, Neb.
- *Electric Wheel Co., Quincy, Ill.
- *Evinrude Motor Co., Milwaukee.
- *Fairbanks, Morse & Co., Chicago.
- *Foss Gas Eng. Co., Springfield, O.
- *Fuller & Johnson Mfg. Co., Madison, Wis.
- *Hinkley Motors, Inc., Detroit.
- *Ingersoll-Rand Co., New York.
- *Minneapolis Steel & Machy. Co., Minneapolis, Minn.
- *Sanderson-Cyclon. Drill Co., Orrville, O.
- *Savel Mfg. Co., Evansville, Ind.
- *Sterling Eng. Co., Buffalo, N. Y.
- *Universal Motor Co., Oshkosh, Wis.
- *Weber Engine Co., Kansas City, Mo.
- *Wisconsin Motor Mfg. Co., Milwaukee.
- *Worthington Pump & Machy. Corp., N.Y.

ENGINES, HOISTING (See Hoists)

ENGINES, INDUSTRIAL (See Power Plants, Industrial)

ENGINES, KEROSENE

- *Alamo Eng. Co., Hillsdale, Mich.
- *Climax Eng. Co., Clinton, Ia.
- *Hercules Motors Corp., Canton, O.
- *John Lanson Mfg. Co., New Holstein, Wis.
- *Stover Mfg. & Eng. Co., Freeport, Ill.
- *Waukesha Motor Co., Waukesha, Wis.
- *Witte Engine Wks., Kansas City, Mo.
- *Electric Wheel Co., Quincy, Ill.
- *Fuller & Johnson Mfg. Co., Madison, Wis.
- *Int'l Harvester Co. of Am., Chicago.

ENGINES, OIL

DIESEL

- *F. Van Rossen Hoogendyk, New York.
- *Allis-Chalmers Mfg. Co., Milwaukee.
- *Bethlehem St. Co., Bethlehem, Pa.
- *Busch-Sulzer Bros.-Deisel Eng. Co., St. Louis.
- *Fairbanks, Morse & Co., Chicago.
- *Fulton Iron Wks. Co., St. Louis.
- *McIntosh & Seymour Corp., Auburn, N.Y.
- *New London Ship & Eng. Co., Groton, Ct.
- *Nordberg Mfg. Co., Milwaukee, Wis.
- *St. Mary's Oil Eng. Co., St. Charles, Mo.
- *Western Machy. Co., Los Angeles, Cal.
- *SEMI-DIESEL
- *Stover Mfg. & Eng. Co., Freeport, Ill.
- *Anderson Engine & Fdry. Co., Anderson, Ind.
- *Bessemer Gas Eng. Co., Grove City, Pa.
- *Buckeye Machinery Co., Lima, O.
- *Charter Gas Eng. Co., Sterling, Ill.
- *Chicago Pneum. Tool Co., N. Y.
- *De La Vergne Mach. Co., N. Y.
- *Fairbanks, Morse & Co., Chicago.
- *Foss Gas Eng. Co., Springfield, O.
- *Ingersoll-Rand Co., N. Y.
- *Lombard Gov. Co., Ashland, Mass.
- *Muncie Oil Eng. Co., Muncie, Ind.
- *Taylor Mach. Co., Cleveland, O.
- *Weber Eng. Co., Kansas City, Mo.
- *Worthington Pump & Machy. Corp., N.Y.

ENGINES, PUMPING

- *Climax Eng. Co., Clinton, Ia.
- *Hercules Motors Corp., Canton, O.
- *Stover Mfg. & Eng. Co., Freeport, Ill.
- *Waukesha Motor Co., Waukesha, Wis.
- *Allis-Chalmers Mfg. Co., Milwaukee.
- *Hoover, Owens, Kentschler Co., Hamilton, O.
- *Murray Iron Wks., Burlington, Ia.
- *Nordberg Mfg. Co., Milwaukee.
- *Worthington Pump & Machy. Corp., N.Y.

ENGINES, SWINGING

- *Mundy Sales Corp., N. Y.
- *Dake Eng. Co., Grand Haven, Mich.
- *Lidgerwood Mfg. Co., N. Y.

EXCAVATING MACHINERY (See Names Under Excavators, also Steam Shovels)

EXCAVATORS, CABLEWAY

- *Erted Machy. Mfg. Co., Portland, Ore.
- *Link-Belt Co., Chicago.
- *Sausman Bros., Inc., Chicago.
- *R. H. Beaumont Co., Philadelphia.
- *Lidgerwood Mfg. Co., N. Y.
- *Street Bros. Mach. Wks., Chattanooga.

EXCAVATORS, CRAWLING TRACTOR

- *Erie Steam Shovel Co., Erie, Pa.
- *Thaw Shovel Co., Lorain, O.
- *Byers Mach. Co., Ravenna, Ohio.
- *EXCAVATORS, DITCH AND TRENCH
- *Barber-Greene Co., Aurora, Ill.
- *Bay City Dredge Wks., Bay City, Mich.
- *Buckeye Trac. Ditcher Co., Findlay, O.
- *Erie Steam Shovel Co., Erie, Pa.
- *Erted Machy. Mfg. Co., Portland, Ore.
- *Inley Mfg. Co., Indianapolis, Ind.
- *Keystone Driller Co., Beaver Falls, Pa.
- *Link-Belt Co., Chicago.
- *Orton Crane & Shovel Co., Chicago.
- *Parsons Co., Newton, Ia.
- *Russell Grader Mfg. Co., Minneapolis.
- *Speeder Machy. Corp., Cedar Rapids, Ia.
- *Star Drilling Mach. Co., Akron, O.
- *Thaw Shovel Co., Lorain, O.
- *Austin Mach. Corp., Muskegon, Mich.
- *Brown Hstg. Machy. Co., Cleveland.
- *Byers Mach. Co., Ravenna, Ohio.
- *Cleveland Trencher Co., Euclid, O.
- *Economy Exc. Co., Iowa Falls, Ia.
- *Harward Co., N. Y.
- *Lidgerwood Mfg. Co., N. Y.
- *Marion Steam Shovel Co., Marion, O.
- *Monaghan Mach. Co., Chicago.
- *Moore Speederane Co., Chicago, Ill.
- *Osgood Co., Marion, O.
- *Owensboro Ditcher & Grader Co., Owensboro, Ky.
- *Street Bros. Mach. Wks., Chattanooga.
- *C. T. Topping Machy. Co., Dayton, O.

EXCAVATORS, DRAG-LINE

- *Bay City Dredge Wks., Bay City, Mich.
- *Erie Steam Shovel Co., Erie, Pa.
- *Erted Machy. Mfg. Co., Portland, Ore.
- *Gallen Ir. Wks. & Mfg. Co., Gallen, O.
- *Koehring Co., Milwaukee.
- *Link-Belt Co., Chicago.
- *Orton Crane & Shovel Co., Chicago.
- *Russell Grader Mfg. Co., Minneapolis.
- *Sausman Bros., Inc., Chicago.
- *Speeder Machy. Corp., Cedar Rapids, Ia.
- *Star Drilling Mach. Co., Akron, O.
- *Thaw Shovel Co., Lorain, O.
- *Amer. Hst. & Derrick Co., St. Paul.
- *Austin Machy. Corp., Muskegon, Mich.
- *Brown Hstg. Machy. Co., Cleveland, O.
- *Browning Crane Co., Cleveland, O.
- *Bueyres Co., So. Milwaukee, Wis.
- *Byers Mach. Co., Ravenna, Ohio.
- *Economy Exc. Co., Iowa Falls, Ia.
- *G. L. Gade, Iowa Falls, Ia.
- *Harnischfeger Corp., Milwaukee, Wis.
- *Harward Co., N. Y.
- *Industrial Wks., Bay City, Mich.
- *Lidgerwood Mfg. Co., N. Y.
- *Marion Steam Shovel Co., Marion, O.
- *Monaghan Mach. Co., Chicago.
- *Moore Speederane Co., Chicago.
- *Osgood Co., Marion, O.

- *Page Eng. Co., Chicago.
- *Street Bros. Mach. Wks., Chattanooga.

EXPANDED METAL

- *Truscon Steel Co., Youngstown, O.
- *Consolidated Exp. Metal Co., Wheeling, W. Va.
- *Northwestern Exp. Metal Co., Chicago.
- *Youngstown Pressed St. Co., Warren, O.

EXPANSION JOINT MATERIAL

- *Barber Asphalt Co., Philadelphia.
- *Barrett Co., N. Y.
- *Phillip Carey Co., Cincinnati, O.
- *W. H. Meadows, Inc., Elgin, Ill.
- *Truscon Steel Co., Youngstown, O.
- *Hoosier Asph. Co., Alexandria, Ind.
- *Pioneer Asph. Co., Lawrenceville, Ill.
- *Servicised Products Corp., Chicago.
- *Texas Co., N. Y.
- *Waring-Underwood Co., Philadelphia.

EXPLOSIVES

- *Atlas Powder Co., Wilmington, Del.
- *E. I. Du Pont de Nemours & Co., Wilmington, Del.
- *Giant Powder Co., S. Francisco, Cal.
- *Grasselli Powder Co., Cleveland, O.
- *Hercules Powder Co., Wilmington, Del.
- *EXTENSION FRAMES, FORD TRUCK
- *Swedish Crucible Steel Co., Detroit.

FENCING

- *American Steel & Wire Co., Chicago.
- *Van Dorn Iron Wks. Co., Cleveland, O.
- *Adrian Wire Fence Co., Adrian, Mich.
- *Amer. Fence & Const. Co., New York.
- *Anchor Post Fence Co., N. Y.
- *Cyclone Fence Co., Waukegan, Ill.
- *Dwiggins Wire Fence Co., Anderson, Ind.
- *Ill. Wire & Mfg. Co., Joliet, Ill.
- *Ind. Steel & Wire Co., Muncie, Ind.
- *Interlocking Fence Co., Morton, Ill.
- *Keystone Stil. & Wire Co., Peoria, Ill.
- *Kokomo Stil. & Wire Co., Kokomo, Ind.
- *Nitselman Bros., Muncie, Ind.
- *Mich. Wire Fence Co., Adrian, Mich.
- *Page Stil. & Wire Prod. Corp., Bridgeport, Conn.
- *Pittsburgh Steel Co., Pittsburgh, Pa.
- *Stewart Ir. Wks. Co., Cincinnati, O.
- *Tex. Cyclone Fence Co., Ft. Worth, Tex.
- *Wayne Iron Wks., Wayne, Pa.
- *Wickwire-Spencer Steel Co., N. Y.

FILING EQUIPMENT, STEEL

- *Van Dorn Iron Wks. Co., Cleveland, O.
- *Art Metal Constr. Co., Jamestown, N.Y.
- *Berger Mfg. Co., Canton, O.
- *Canton Art Metal Co., Canton.
- *Gen. Fireproofing Co., Youngstown, O.

FILTERS, OIL

- *S. F. Bowser & Co., Inc., Ft. Wayne, Ind.

FILTERS, WATER

- *Amer. Water Softener Co., Phila., Pa.
- *Cochrane Corp., Phila.
- *Graver Corporation, E. Chicago, Ind.
- *International Filter Co., Chicago.
- *Norwood Eng. Co., Florence, Mass.
- *Roberts Filter Co., Darby, Pa.
- *W. B. Seale & Sons, Pittsburgh, Pa.

FINISHING MACHINES, CONCRETE ROAD (See Concrete Road Finishers)

FIRE & POLICE ALARM SYSTEMS

- *Gamewell Co., Newton Upper Falls, Mass.
- *Harrington-Seaberg Corp., Moline, Ill.
- *Sterling Siren Fire Alarm Co., Rochester, N. Y.

FIRE ALARM SIRENS

- *Union Water Meter Co., Worcester, Mass.
- *Erick Elec. Siren Co., St. Paul, Minn.
- *Federal Sign System, Chicago.
- *Hendrie & Bolthoff Mfg. & Sup. Co., Denver, Colo.
- *Holitzer-Cabot Elec. Co., Boston.
- *Sterling Siren Fire Alarm Co., Rochester, N. Y.

FIRE APPARATUS, MOTOR

- *Mack Trucks, Inc., N. Y.
- *Ahrens-Fox Fire Eng. Co., Cincinnati, O.

If you find any errors or omissions in this Where to Purchase list, please send corrections to
CONTRACTORS AND ENGINEERS MONTHLY



for
**DEPENDABLE
POWER**

Wherever There's Work

—you invariably find the Le Roi Engine on the job. Whether it's keeping the mixer drum humming or a saw rig buzzing — it gives the same dependable, low-cost power.

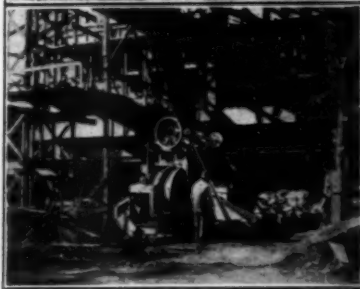
To distinguish itself in its field — Le Roi boasts of an unparalleled record — the lowest operating cost per day and year. Look to Le Roi for dependable power.

LE ROI COMPANY

Milwaukee, Wis.

LE ROI ENGINES

3 to 160 HORSE POWER



Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.

Where to Purchase

- Amer-La France & Foamite Corp.**, New York
Boyer Fire App. Co., Logansport, Ind.
Brookway Motor Fire App. Co., Cortlandt, N. Y.
Buffalo Fire Appl. Corp., Buffalo, N. Y.
Hale Fire Pump Co., Conshohocken, Pa.
Jaeger Portable Power Corp'n., Detroit
Northern Fire Apparatus Co., Minneapolis, Minn.
Peter Pirch & Sons Co., Kenosha, Wis.
Prospect Fire Engine Co., Prospect, O.
Seagrave Co., Columbus, O.
Stuts Fire Eng. Co., Indianapolis, Ind.
Waterous Fire Eng. Wks., St. Paul, Minn.
White Co., Cleveland
- FIRE EXTINGUISHERS, CHEMICAL**
Amer-La France & Foamite Corp., New York
Buffalo Fire App. Corp., Buffalo, N. Y.
Firenza-Childs Corp., Utica, N. Y.
Fyrene Mfg. Co., Newark, N. J.
- FIRE HOSE (See Hose, Fire)**
- FIRST AID EQUIPMENT**
Amer-La France & Foamite Corp., New York
- FITTINGS, ACID RESISTING**
***Barber Asphalt Co.**, Philadelphia.
- FLEXIBLE JOINTS**
***Central Foundry Co.**, N. Y.
***U. S. C. I. Pipe & Fdry. Co.**, Burlington, N. J.
Coldwell-Wilcox Co., Newburgh, N. Y.
Crane Co., Chicago.
United Lead Company, N. Y.
- FLOOD LIGHTING PROJECTORS**
General Electric Co., Schenectady.
- FLOORING, COMPOSITION**
***Barber Asphalt Co.**, Phila., Pa.
***Barrett Co.**, N. Y.
Am. Mason Safety Tr. Co., Lowell, Mass.
Johns-Manville, Inc., N. Y.
Marine Decking & Sup. Co., Phila., Pa.
Franklyn R. Muller & Co., Waukegan, Ill.
- FLOORS, WOOD BLOCK**
***Barrett Co.**, N. Y.
Carter Bloxomend Flooring Co., Kansas City, Mo.
Jennison-Wright Co., Toledo, O.
Midland Creos. Co., Toledo, O.
Republic Creos. Co., Indianapolis, Ind.
Sou. Wood Preserving Co., Atlanta, Ga.
Wyckoff Pipe & Creos. Co., N. Y.
- FLUSH TANKS**
***Pacific Flush Tank Co.**, Chicago & N. Y.
- FLUSHERS, STREET (See Street Flushers and Sprinklers)**
- FORGES**
Buffalo Forge Co., Buffalo, N. Y.
Hauck Mfg. Co., B'klyn, N. Y.
- FORGES, OIL (Rivet Heating)**
***Mead-Morrison Mfg. Co.**, E. Boston
Hauck Mfg. Co., B'klyn, N. Y.
- FORM CLAMPS**
***Hawley Mfg. Co.**, Chicago.
***Insley Mfg. Co.**, Indianapolis, Ind.
W. A. Kuhlman & Co., Toledo, O.
M. & M. Wire Clamp Co., Minneapolis.
Universal Form Clamp Co., Chicago.
- FORMS, CONCRETE**
***Blaw-Knox Co.**, Pittsburgh, Pa.
***Heltzel Fd. Form & Ir. Co.**, Warren, O.
***Lakewood Eng. Co.**, Cleveland, O.
***Truscon Steel Co.**, Youngstown, O.
Concrete Form Co., Inc., Syracuse, N. Y.
- Hotchkiss Stl. Products Co.**, Binghamton, N. Y.
Metal Forms Corp., Milwaukee.
- FORMS, MANHOLE, PIPE, SEWER, ETC**
***Heltzel Stl. Form & Ir. Co.**, Warren, O
- FORMGRADERS**
***Ted Carr & Co.**, Chicago
- FOUNTAINS, DRINKING**
Casey-Hedges Co., Chattanooga, Tenn.
Jas. B. Clow & Sons, Chicago.
Crane Co., Chicago.
J. L. Mott Iron Wks., New York
Murdock Mfg. & Sup. Co., Cincinnati.
Puro San. Dr. Ftn. Co., Haydensville, Mass.
Rundle-Spence Mfg. Co., Milwaukee.
Stewart Iron Wks. Co., Cincinnati, O.
Halsey W. Taylor Co., Warren, O.
Century Brass Wks., Belleville, Ill.
- FULL CRAWLERS**
***Trackson Co.**, Milwaukee
- FURNITURE AND FILES, STEEL**
***Van Dorn Iron Wks. Co.**, Cleveland, O.
Art Metal Const. Co., Jamestown, N. Y.
Canton Art Metal Co., Canton.
Gen. Fireproofing Co., Youngstown, O.
- FURRING AND SLEEPER ANCHORS**
Dayton Sure Grip & Shore Co., Dayton, O.
- GABAGE CANS (See Cans)**
- GABAGE DISPOSAL SYSTEMS**
American Beccari Corp., N. Y.
C. O. Bartlett & Snow Co., Cleveland, O.
Decarie Incinerator Co., L. I. C., N. Y.
Goder Incinerator Corp., Chicago.
Hiler Eng. & Const. Co., B'klyn, N. Y.
Midwest Incinerator Co., Chicago.
Morse-Boulger Destructor Co., N. Y.
Nye Odorless Crematory Co., Macon, Ga.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
- GABAGE TRAILERS AND BODIES**
***Heil Co.**, Milwaukee.
Highway Trailer Co., Edgerton, Wis.
***Littleford Bros.**, Cincinnati.
Atia Corp., New York.
Detroit Trailer & Mach. Co., Detroit.
Lee Trailer & Body Co., Plymouth, Ind.
Troy Trailer & Wagon Co., Troy, O.
- GABAGE TRUCKS**
***Heil Co.**, Milwaukee, Wis.
Geo. H. Holsbog & Bro., Jeffersonville, Ind.
Lee Trailer & Body Co., Plymouth, Ind.
Rex-Watson Corp., Canastota, N. Y.
- GAS METERS (See Meters, Gas)**
- GAS PRODUCERS**
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
R. D. Wood & Co., Phila., Pa.
- GASOLINE STORAGE TANKS**
***Heil Co.**, Milwaukee, Wis.
***Littleford Bros.**, Cincinnati, O.
Biggs Boiler Works, Akron, O.
Birmingham Tank Co., Birmingham, Ala.
S. F. Bowser & Co. Inc., Ft. Wayne, Ind.
Chicago Bridge & Iron Wks., Chicago.
Graver Corp., E. Chicago, Ind.
Wm. B. Scaife & Sons, Pittsburgh, Pa.
Tokheim Oil Tank & Pump Co., Ft. Wayne, Ind.
United Iron Wks. Inc., K. City, Mo.
Wayne Co., Ft. Wayne, Ind.
- GATES, SLUICE**
Chapman Valve Mfg. Co., Indian Orchard, Mass.
Coffin Valve Co., Boston, Mass.
Coldwell-Wilcox Co., Newburgh, N. Y.
R. Hardesty Mfg. Co., Denver.
Ladlow Valve Mfg. Co., Troy, N. Y.
- GATES FOR PARKS AND CRIBS, TERRES**
Stewart Iron Wks. Co., Cincinnati, O.
Wayne Iron Wks., Wayne, Pa.
- GAUGES, WATER**
Bristol Co., Waterbury, Conn.
Lunkenheimer Co., Cincinnati, O.
Walworth Mfg. Co., Boston.
- GAUGES, SURFACE, RESERVOIR AND SPECIAL WATER-WORKS**
Builders Iron Fdry., Providence, R. I.
Simplex Valve & Meter Co., Phila., Pa.
- GENERATOR SETS**
***Climax Eng. Co.**, Clinton, Iowa.
***Cook Motor Co.**, Delaware, O.
Carbic Mfg. Co., Duluth.
- GLASS, FIREPROOF (See Wire Glass)**
- GOVERNORS, GASOLINE ENGINE**
***Gardner-Denver Co.**, Denver, Col.
Pickering Governor Co., Portland, Ct.
- GRADERS, ROAD (See Road Graders)**
- GRADER, BLADES**
***Gallon Ir. Wks. & Mfg. Co.**, Gallon, O.
***Russell Grader Mfg. Co.**, Minneapolis
J. D. Adams & Co., Indianapolis, Ind.
Shunk Mfg. Co., Bucyrus, O.
- GRAND STANDS, PORTABLE**
Circle A. Prod. Corp., Newcastle, Ind.
Leavitt Mfg. Co., Urbana, Ill.
Wayne Iron Wks., Wayne, Pa.
- GRATING, STEEL**
***Blaw-Knox Co.**, Pittsburgh.
- GREASE**
***Jos. Dixon Crucible Co.**, Jersey City, N. J.
***Dixoy, Inc.**, St. Louis.
- GRINDERS**
Chicago Pneum. Tool Co., N. Y.
Cleveland Pneum. Tool Co., Cleveland, O.
Ingersoll-Rand Co., N. Y.
- GRIZZLIES**
***Smith Engineering Works**, Milwaukee
Allis-Chalmers Mfg. Co., Milwaukee
Austin Mfg. Co., Chicago.
Robins Conv. Belt Co., New York
Stephens-Adamson Mfg. Co., Angora, Ill.
- GUARDS, ROAD & HIGHWAY**
***Am. Steel & Wire Co.**, Chicago.
***Williamsport Wire Rope Co.**, Williamsport, Pa.
Cyclone Fence Co., Waukegan, Ill.
Hazard Mfg. Co., Wilkesbarre, Pa.
Stewart Iron Wks. Co., Cincinnati.
Wickwire-Spencer Steel Co., N. Y.
- GYPSPUM PRODUCTS**
U. S. Gypsum Co., Chicago.
Fenton Mfg. Co., Cleveland, O.
- HAMMERS, STEAM, PILE (See Pile Hammers, Steam)**
- HEAT INSULATING MATERIAL**
***Philip Carey Co.**, Cincinnati, O.
Johns-Manville, Inc., N. Y.
- HEATING KETTLES (See Kettles)**
- HIGHWAY MOWERS**
Rawie Mfg. Co., Chicago.
- HITCHES**
***Gustav Schaefer Wagon Co.**, Cleveland, O.
***Trail-It Co.**, St. Paul.
***Whitehead & Eales Co.**, Detroit.
Detroit Trailer & Mach. Co., Detroit.
Fenton Mfg. Co., Cleveland, O.
- HOISTS, AUTOMATIC**
Zetterlund Hat. & Mch. Co., Milwaukee.
- HOISTS, BELT-DRIVEN**
***Amer. Saw Mill Mch. Co.**, Hackensack, N. J.
***Dobbs Fdry. & Mach. Co.**, Niagara Falls.
***Domestic Engine & Pump Co.**, Shippensburg, Pa.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*



What Is This Secrecy Surrounding Heltzels 1928 Road Show Display?

WHAT are these rumors going 'round that HELTZEL has developed a new steel road form which is years ahead of the times? A wee small voice says wait, examine and see it with your own eyes.

What is this new mechanical joint machine for installing longitudinal and transverse joints in city streets and roads and this new collapsible form for the same purpose?

What are these new yoke type curb forms?

And material handling equipment! Absolutely no details until the road show. But, listen! So much contractors' equipment is going out of date in 1928 that every contractor and engineer will wonder what is coming next.

If you can't be at the show, write HELTZEL and put your name on record for any of these new HELTZEL catalogs:

Modern Road Building Equipment
Modern Street Building Equipment
Modern Material Handling Equipment

No copies released until after Jan. 10, 1928

See HELTZEL display at Booth AA-4, Auditorium
 Cleveland, Ohio, Road Show, Jan. 9th to 13th, 1928

THE HELTZEL STEEL FORM & IRON CO., WARREN, OHIO

Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.

Where to Purchase

*Mead-Morrison Mfg. Co., Boston, Mass.
 *Mundy Sales Corp., N. Y.
 American Hoist & Derrick Co., St. Paul, Minn.
 Lidgerwood Manufacturing Co., N. Y.
 Street Bros. Mach. Wks., Chattanooga.
 Weller Mfg. Co., Chicago.

HOISTS, CONCRETE, TOWER

*Domestic Eng. & Pump Co., Shippensburg, Pa.
 *Insley Mfg. Co., Indianapolis, Ind.
 *Lakewood Eng. Co., Cleveland, O.
 *Mead-Morrison Mfg. Co., Boston.
 *Mundy Sales Corp., N. Y.
 *Nove Engine Co., Lansing, Mich.
 *Ransome Conc. Mch. Co., Dunellen, N. J.
 English Bros. Machy. Co., Kansas City.
 Lidgerwood Manufacturing Co., N. Y.
 Street Bros. Mach. Wks., Chattanooga.

HOISTS, ELECTRIC

*Clyde Iron Wks. Sales Co., Duluth, Minn.
 *Dobbie Fdry & Mach. Co., Niagara Falls.
 *Domestic Eng. & Pump Co., Shippensburg, Pa.
 *S. Flory Mfg. Co., Bangor, Pa.
 *Mead-Morrison Mfg. Co., Boston.
 *Mundy Sales Corp., N. Y.
 *Nove Engine Co., Lansing, Mich.
 *O. K. Clutch & Mach. Co., Columbia, Pa.
 *Sullivan Machy. Co., Chicago.
 Am. Hoist & Derrick Co., St. Paul, Minn.
 Chisholm-Moore Co., Cleveland, O.
 Construction Machy. Co., Waterloo, Ia.
 Dake Eng. Co., Grand Haven, Mich.
 English Bros. Machy. Co., Kansas City.
 Harnischfeger Corp., Milwaukee.
 Lidgerwood Manufacturing Co., N. Y.
 Ntl. Hoisting Eng. Co., Harrison, N. J.
 Northern Eng. Wks., Detroit.
 Street Bros. Mach. Wks., Chattanooga.
 Thomas Elev. Co., Chicago.
 Treadwell Eng. Co., Easton, Pa.
 Vulcan Iron Wks., Wilkes-Barre, Pa.

HOISTS, FORDSON

*Clyde Ir. Wks. Sales Co., Duluth, Minn.
 *Ersted Mach. Mfg. Co., Portland, Ore.
 *Pioneer Tractors Inc., Winona, Minn.
 Okla. Eng. & Fdry. Co., Muskogee, Okla.
 Otis Eng. Corp., N. Y.
 Sheffield Tool & Supply Co., Sheffield, Pa.
 Willamette Iron & Steel Wks., Portland, Ore.

HOISTS, GASOLINE

*Amer. Saw Mill Mch. Co., Hackettstown, N. J.
 *Clyde Iron Wks. Sales Co., Duluth, Minn.
 *Domestic Eng. & Pump Co., Shippensburg, Pa.
 *Ersted Mach. Mfg. Co., Portland, Ore.
 *S. Flory Mfg. Co., Bangor, Pa.
 *Lansing Co., Lansing, Mich.
 *Mead-Morrison Mfg. Co., Boston.
 *Mundy Sales Corp., N. Y.
 *Nove Engine Co., Lansing, Mich.
 *O.K. Clutch & Mach. Co., Columbia, Pa.
 *Pioneer Tractors, Inc., Winona, Minn.
 Amer. Hoist & Der. Co., St. Paul, Minn.
 Amer. Mfg. & Eng. Co., Kalamazoo, Mich.
 Austin Mfg. Co., Chicago.
 Buffalo Hoist & Derrick Co., Buffalo, N. Y.
 C. H. & E. Mfg. Co., Milwaukee.
 Construction Machy. Co., Waterloo, Ia.
 Dake Eng. Co., Grand Haven, Mich.
 English Bros. Machy. Co., Kansas City.
 Lidgerwood Manufacturing Co., N. Y.
 Ntl. Hoisting Eng. Co., Harrison, N. J.
 Orr & Sombower, Reading, Pa.
 Street Bros. Mach. Wks., Chattanooga.
 Thomas Elevator Co., Chicago.

HOISTS, PNEUMATIC

*Gardner-Denver Co., Denver, Col.
 *Mead-Morrison Mfg. Co., Boston.
 *Sullivan Mch. Co., Chicago.
 Chicago Pneumatic Tool Co., N. Y.
 Curtis Pa. Mch. Co., St. Louis.

Lake Engine Co., Grand Haven, Mich.
 Detroit Hoist & Mach. Co., Detroit.
 Gilman Mfg. Co., E. Boston, Mass.
 Hanna Eng. Works, Chicago.
 Independent Pneum. Tool Co., Chicago.
 Ingersoll-Rand Co., N. Y.
 Northern Eng. Wks., Detroit, Mich.
 Worthington Pump & Mch. Corp., N. Y.

HOISTS, STEAM

*Clyde Iron Wks. Sales Co., Duluth, Minn.
 *S. Flory Mfg. Co., Bangor, Pa.
 *Mead-Morrison Mfg. Co., Boston.
 *Mundy Sales Corp., N. Y.
 *Sullivan Machy. Co., Chicago.
 Amer. Hoist & Derrick Co., St. Paul, Minn.
 Dake Engine Co., Grand Haven, Mich.
 Hardie-Tynes Mfg. Co., Birmingham, Ala.
 Ingersoll-Rand Co., N. Y.
 Lidgerwood Manufacturing Co., N. Y.
 Ntl. Hoisting Eng. Co., Harrison, N. J.
 Orr & Sombower, Reading, Pa.
 Street Bros. Mach. Wks., Chattanooga.
 Thomas Elev. Co., Chicago.
 Treadwell Eng. Co., Easton, Pa.

HOISTS FOR MOTOR TRUCKS

*Heil Co., Milwaukee.
 *Van Dorn Iron Wks., Cleveland, O.
 *Wood Hydr. Hoist & Body Co., Detroit.
 Atia Corp., New York.
 Hydr. Hoist Mfg. Co., St. Paul, Minn.
 Joliet Mfg. Co., Joliet, Ill.
 Lidgerwood Manufacturing Co., N. Y.
 Rock Mfg. Co., Waterloo, N. Y.

HOISTS, PORTABLE

*Pioneer Tractors, Inc., Winona, Minn.
 Jas. B. Seaverns Co., Batavia, Ill.
 Joliet Mfg. Co., Joliet, Ill.
HOPPERS, CONCRETE (Aggregate Measuring)
 *Heltzel St. Form & Ir. Co., Warren, O.
 *Lakewood Eng. Co., Cleveland, O.
 *Ransome Conc. Mch. Co., Dunellen, N. J.
 Rustler Bin Co., Waukegan, Wis.
 C. S. Johnson Co., Champaign, Ill.
 Jas. B. Seaverns Co., Batavia, Ill.

HOSE, AIR

*The Dallett Co., Phila., Pa.
 *Hardsoc Wonder Dr. Co., Ottumwa, Ia.
 Chicago Pneumatic Tool Co., N. Y.
 Cincinnati Rubber Mfg. Co., Cincinnati.
 Cleveland Rock Drill Co., Cleveland, O.
 Gilman Mfg. Co., E. Boston, Mass.
 Goodyear Tire & Rubber Co., Akron, O.
 Ingersoll-Rand Co., N. Y.
 Mulconroy Co., Inc., Phila., Pa.
 Penna. Flexible Metallic Tubing Co., Phila., Pa.
 Republic Rubber Co., Youngstown, O.
 U. S. Rubber Co., N. Y.

HOSE, FIRE

Bi-Lateral Fire Hose Co., Chicago.
 Eureka Fire Hose Mfg. Co., N. Y.
 Fabrie Fire Hose Co., N. Y.
 B. F. Goodrich Rubber Co., Akron, O.
 Goodyear Tire & Rubber Co., Akron, O.

HOUSE-MOVING EQUIPMENT

*La Plant-Ochoate Mfg. Co., Cedar Rapids, Ia.

HOUSE NUMBERS

Hamilton Metal Prod. Co., Hamilton, O.
 C. H. Hanson Co., Chicago.
 Niagara Metal Stamping Corp., Niagara Falls, N. Y.

HOUSES, PORTABLE (See Portable Buildings)

HYDRANTS, FIRE

Chapman Valve Mfg. Co., Indian Orchard, Mass.
 Columbian Ir. Wks., Chatta., Tenn.
 Darling Valve & Mfg. Co., Williamsport, Pa.

Eddy Valve & Mfg. Co., Waterford, N. Y.
 Iowa Valve Co., Oskaloosa, Ia.
 Kennedy Valve Mfg. Co., Elmira, N. Y.
 Ludlow Valve Mfg. Co., Troy, N. Y.
 Norwood Eng. Co., Florence, Mass.
 Rensselaer Valve Co., Troy, N. Y.
 A. P. Smith Mfg. Co., E. Orange, N. J.
 Waterson Co., St. Paul.
 R. D. Wood & Co., Phila., Pa.

HYDRAULIC RAMS

Deming Co., Salem, O.
 Johnson Mfg. Co., Seattle, Wash.
 Rife Hydraulic Engine Co., N. Y.
 Rumsey Pump Co., Seneca Falls, N. Y.

ICE-MAKING MACHINERY

Arctic Ice Mach. Co., Canton, O.
 Baker Ice Mach. Co., Omaha, Neb.
 Brunswick-Kroeschell Co., N. Brunswick, N. J.
 Carbondale Mach. Co., Carbondale, Pa.
 De La Vergne Mach. Co., N. Y.
 Frick Co., Inc., Waynesboro, Pa.
 Ingersoll-Rand Co., New York.
 Triumph Ice Mach. Co., Cincinnati, O.
 United Iron Wks., Inc., K. City, Mo.
 Vilter Mfg. Co., Milwaukee, Wis.
 Henry Vogt Mach. Co., Louisville, Ky.
 York Mfg. Co., York, Pa.

IGNITION SYSTEMS

*Eisemann Magneto Corp., New York.
 American Bosch Magneto Corp., Springfield, Mass.
 Dayton Eng. Lab. Co., Dayton, O.
 Splidorf Electric Co., Newark, N. J.

INCINERATORS, GARBAGE (See Garbage Disposal)

INDICATOR POSTS (See Valves)

INSPECTING LABORATORIES

*Conard & Busby, Burlington, N. J.
 *Pittsburgh Testing Lab., Pittsburgh.
 Allentown Testing Lab., Allentown, Pa.
 E. L. Conwell & Co., Phila., Pa.
 Gulick-Henderson Co., N. Y.
 Robert W. Hunt Co., Chicago.
 N. Y. Testing Lab., N. Y.

INSTRUMENTS AND SUPPLIES (See Vendors and Engineers')

Wm. Ainsworth & Sons, Denver, Col.
 L. Beckman Co., Toledo, O.
 C. L. Berger & Sons, Boston.
 Brandis & Sons Mfg. Co., B'klyn N. Y.
 Buff & Buff Mfg. Co., Boston.
 Eugene Dietzgen Co., Chicago.
 W. & L. E. Gurley, Troy, N. Y.
 Keuffel & Esser Co., Hoboken, N. J.
 Kolesch & Co., New York.
 A. Lietz Co., San Francisco.
 Leopold-Volpel & Co., Portland, Ore.
 Warren Knight Co., Phila., Pa.
 F. Weber & Co., Phila., Pa.
 D-vaid White Co., Milwaukee, Wis.

INTEGRAL CURB AND BASE FORMS (See Forms, Concrete)

IRON WORK, STRUCTURAL AND ORNAMENTAL (See Bridges and Buildings)

JACKS, LIFTING

*McKiernan-Terry Drill Co., N. Y.
 *Templeton, Kenly & Co., Ltd., Chicago.
 Duff Mfg. Co., Pittsburgh, Pa.
 Joyce-Cridland Co., Dayton, O.
 A. O. Norton, Inc., Moline, Ill.
 Oil Jack Co., N. Y.
 Rees Mfg. Co., Pittsburgh, Pa.
 Watson-Stillman Company, N. Y.

JACKS, PIPE FORGING

Duff Mfg. Co., Pittsburgh, Pa.
 Easy Mfg. Co., Lincoln, Neb.

JAIL AND PRISON WORK

*Van Dorn Iron Wks. Co., Cleveland.
 E. T. Barnum Iron Wks., Detroit.

If you find any errors or omissions in this Where to Purchase list, please send corrections to
 CONTRACTORS AND ENGINEERS MONTHLY

the longest jump of all



Made by The MUNDY 3-speed HOIST

TRADE MARK
MUNDY
ESTABLISHED 1899

To Equipment Distributors

The New Patent Three-Speed Hoist is fully protected by patents in the United States and Canada.

Some open exclusive sales territory is now available.

IN the field of hoisting equipment, the Mundy Patented Three-Speed Hoist is today the undisputed champion. It has so far "out-jumped" the old-fashioned hoist in design and performance ability that it is the first choice of those who want—and expect to get—the most from their hoisting equipment.

You may ask—"What is this big 'jump' that the Mundy Hoist has made?" Well, here's the answer. The Mundy Patented Three-Speed Hoist is virtually *three* hoists—with three different hoisting speeds—all built into a single compact unit. Isn't that an appreciable improvement over the old-fashioned hoist?

And the beauty of it all is the ease with which any one of the three speeds may be utilized. Simply shift a lever—that's

all there is to it—and you instantly have a different speed and line pull. From an economy standpoint think what that means. No longer any need of loafing along with a light load, when the Mundy could have it there in a fraction of the time and be back after another. There is plenty of "backbone" too, in that slow speed, when the load is a heavy one. If you operate a hoist, or contemplate doing so, you can't do better than to investigate the Mundy.

The Mundy Sales Corporation

Distributors for the J. S. Mundy Hoisting Engine Co.

30 Church St., New York

Agents in Principal Cities

MUNDY HOISTS

The Hoist With The Asbestall Frictions

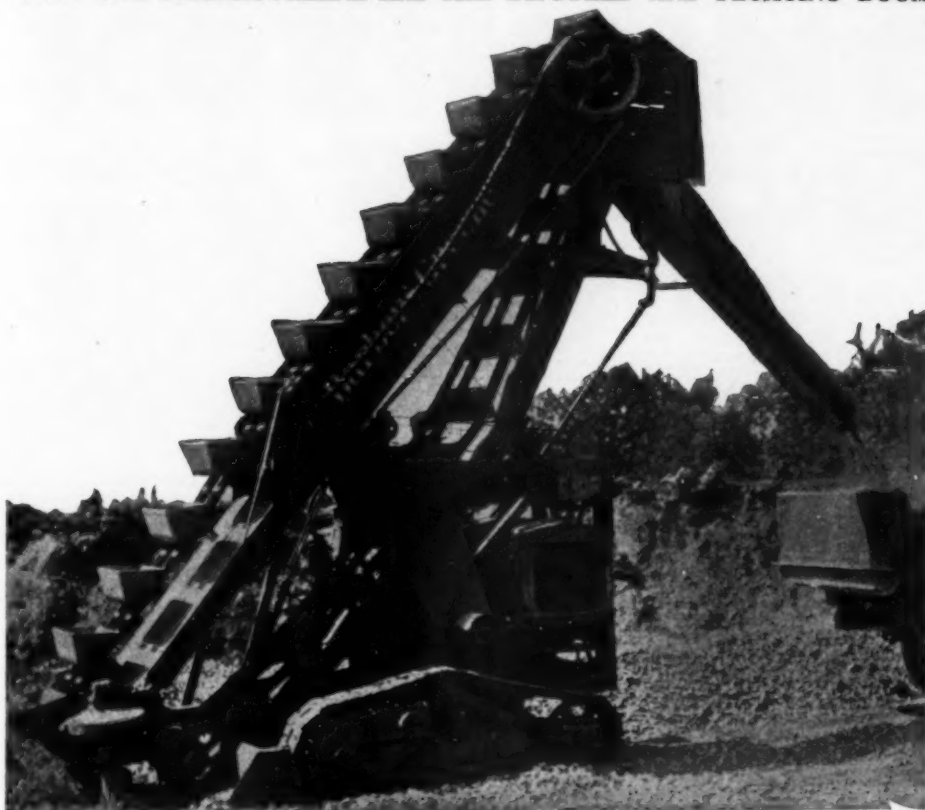
Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

Where to Purchase

- Fries & Son Steel Const. & Eng. Co.**, Covington, Ky.
Pauly Jail Bldg. Co., St. Louis, Mo.
Stewart Iron Wks. Co., Cincinnati, O.
- JOINTS, EXPANSION PAVING** (See Expansion Joint Material)
- JOINTS, FLEXIBLE PIPE** (See Flexible Joints)
- JOISTS, STEEL**
 *Truscon Steel Co., Youngstown, O.
 Berger Mfg. Co., Canton, O.
 Genfire Steel Co., Youngstown, O.
 Ingalls Steel Prod. Co., Birmingham, Ala.
- KETTLES, FOR ASPHALT AND TAR**
 *Acme Rd. Mach. Co., Frankfort, N. Y.
 *Aeroll Burner Co., West New York, N. J.
 *Barber Asphalt Co., Phila., Pa.
 *Connerly & Co., Inc., Phila., Pa.
 *Good Eds. Mch. Co., Kennett Sq., Pa.
 *Jos. Honhorst Co., Cincinnati, O.
 *Kinney Mfg. Co., Boston, Mass.
 *Lattiford Bros., Cincinnati, O.
 *Spears-Wells Mch. Co., Oakland, Cal.
 *Union Iron Works, Inc., Hoboken, N. J.
 Chase & Lyman, Boston, Mass.
 Chausse Oil Burner Co., Elkhart, Ind.
 Hauck Mfg. Co., B'klyn, N. Y.
 Macleod Co., Cincinnati, O.
 G. L. Stuebner Jr. Wks., Inc., Long Island City, N. Y.
 Tarrant Mfg. Co., Saratoga Spgs., N. Y.
 Universal Rd. Mach. Co., Kingston, N. Y.
- LANTERNS, CONTRACTORS'**
 *Alex. Milburn Co., Baltimore, Md.
 Deffance Lantern & Stamping Co., Rochester, N. Y.
 R. E. Dietz Co., N. Y.
 Economy Elec. Lantern Co., Chicago.
 Handlan, Buck Mfg. Co., St. Louis
 Star Headlight & Lantern Co., Rochester, N. Y.
- LATH, METAL**
 *Truscon Steel Co., Youngstown, O.
 Berger Mfg. Co., Canton, O.
 Bostwick Steel Lath Co., Niles, O.
 Consolidated Expanded Metals Co., Wheeling, W. Va.
 Genfire Steel Co., Youngstown, O.
 Northwestern Exp. Metal Co., Chicago
 Penn. Metal Co., Boston, Mass.
 Sykes Metal Lath and Roofing Co., Niles, O.
 Youngstown Pressed Steel Co., Warren, O.
- LAWN MOWERS**
 *Kinney Standards, Inc., B'klyn, N. Y.
 Chadborn & Coldwell Mfg. Co., New Coldwell Lawn Mower Co., Newburgh, N. Y.
 Gilson Mfg. Co., Port Washington, Wis.
 Ideal Power Lawn Mower Co., Lansing, Mich.
 Jacobsen Mfg. Co., Racine, Wis.
 Modern Mach. Wks., Milwaukee.
 Penna. Lawn Mower Wks., Phila., Pa.
 Phila. Lawn Mower Co., Phila., Pa.
 S. F. Townsend Co., Bloomfield, N. J.
 Worthington Mower Co., Stroudsburg, Pa.
- LAWN MOWER SHARPENERS**
 Fate-Root-Heath Co., Plymouth, 6.
- LEADITE**
 The Leadite Co., Phila., Pa.
- LEAD-MELTING FURNACES**
 *Aeroll Burner Co., West New York, N. J.
 *Littleford Bros., Cincinnati, O.
 Canton Fdry. & Mch. Co., Canton, O.
 Chicago Flexible Shaft Co., Chicago
 Hauck Mfg. Co., B'klyn, N. Y.
 A. P. Smith Mfg. Co., E. Orange, N. J.
- LETTERING GUIDES**
 Wood-Regan Inst. Co., So. Orange, N. J.
- LETTERS AND FIGURES, METAL**
 Niagara Metal Stamp. Corp., Niagara Falls, N. Y.
- LIGHTS, CONTRACTORS'**
 *Alex. Milburn Co., Baltimore, Md.
 *National Carbide Sales Corp., New York
 General Elec. Co., Schenectady, N. Y.
 Carbide Mfg. Co., Duluth, Minn.
 Hauck Mfg. Co., B'klyn, N. Y.
 Macleod Co., Cincinnati, O.
 Prest-O-Lite Co., Inc., N. Y.
- LIGHTING STANDARDS** (See Street Lamp Posts)
- LIQUID CHLORINE**
 Arnold, Hoffman & Co., Inc., N. Y.
 Electro Bleaching Gas Co., N. Y.
 Hooker Electrochemical Co., N. Y.
 Mathieson Alkali Works, Inc., N. Y.
 Penna. Salt Mfg. Co., Phila., Pa.
- LOADERS, GRAVEL, WAGON, CAR, ETC.**
 *Barber-Greene Co., Aurora, Ill.
 *Bay City Dredge Wks., Bay City, Mich.
 *Erie Steam Shovel Co., Erie, Pa.
 *Chicago Automatic Conv. Co., Chicago
 *Gallon Jr. Wks. & Mfg. Co., Gallon, O.
 *Geo. Hais Mfg. Co., N. Y.
 *Helmsel St. Form & Ir. Co., Warren, O.
 *Link-Belt Co., Chicago
 *Northern Conveyor Co., Janesville, Wis.
 *Russell Grader Mfg. Co., Minneapolis
 *Sauerman Bros., Chicago
 *Spears-Wells Mch. Co., Oakland, Cal.
 *Star Drilling Mach. Co., Akron, O.
 Bonney Supply Co., Inc., Rochester, N. Y.
 Brown Hoisting Mch. Co., Cleveland
 Burch Corp'n., Crestline, O.
 Conant Mach. Co., Concord Junct., Mass.
 F-S Mfg. Co., New Holstein, Wis.
 Fairfield Eng. Co., Marion, O.
 Gifford-Wood Co., Hudson, N. Y.
 Jeffrey Mfg. Co., Columbus, O.
 Kent Mach. Co., Kent, O.
 Hughes-Keenan Co., Mansfield, O.
 Lee Trailer & Body Co., Plymouth, Ind.
 Lesman Loader Mfg. Co., Des Moines, Ia.
 Logan Co., Louisville, Ky.
 Nelson Iron Wks., Passaic, N. J.
 New Holland Mch. Co., N. Holland, Pa.
 Portable Machinery Co., Clifton, N. J.
 H. B. Sackett Screen & Chute Co., Chicago
 Specialty Eng. Co., Phila., Pa.
 Universal Rd. Mach. Co., Kingston, N. Y.
 Weller Mfg. Co., Chicago
- LOCKERS, STEEL**
 Durand Steel Locker Co., Chicago
 Hart & Hutchinson Co., N. Britain, Ct.
 Lyon Metallic Mfg. Co., Aurora, Ill.
 Fred. Medart Mfg. Co., St. Louis, Mo.
- LOCOMOTIVES, FOR CONTRACTORS, ETC.**
 *Brookville Truck & Tractor Co., Brookville, Pa.
 *Geo. D. Whitcomb Co., Rochelle, Ill.
 Baldwin Loc. Wks., Phila., Pa.
 Davenport Loc. Wks., Davenport, Ia.
 Fate-Root-Heath Co., Plymouth, O.
 Heisler Locomotive Wks., Erie, Pa.
 Mid-West Locomotive Wks., Cincinnati
 Lima Loc. Wks., Lima, O.
 Milwaukee Loc. Mfg. Co., Milwaukee
 Plymouth Loc. Wks., Plymouth, O.
 H. K. Porter Co., Pittsburgh, Pa.
 Vulcan Iron Wks., Wilkes-Barre, Pa.
 Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.
- LUBRICANTS**
 *D-A Lubricant Co., Ind'p'l's, Ind.
 *Dixoy, Inc., St. Louis
 Texas Co., New York
- MANHOLE COVERS** (See Castings)
- METAL LATH** (See Lath)
- METAL ROOFING** (See Roofing)
- METER BOXES**
 Builders Iron Foundry, Providence, R. I.
 H. W. Clark Co., Mattoon, Ill.
 Clarksville Fdry. & Mach. Co., Clarksville, Tenn.
 J. B. Clow & Sons, Chicago
 Columbian Ir. Wks., Chattanooga, Tenn.
 Ford Meter Box Co., Wabash, Ind.
 Mueller Co., Decatur, Ill.
 J. S. Schofield's Sons Co., Macon, Ga.
- METER COUPLINGS**
 *Neptune Meter Co., N. Y.
 *Union Water Meter Co., Worcester, Mass.
 H. W. Clark Co., Mattoon, Ill.
 Ford Meter Box Co., Wabash, Ind.
 Hersey Mfg. Co., So. Boston, Mass.
 Mueller Co., Decatur, Ill.
 Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
- METER TESTERS**
 *Neptune Meter Co., N. Y.
 H. W. Clark Co., Mattoon, Ill.
 Ford Meter Box Co., Wabash, Ind.
 Mueller Co., Decatur, Ill.
 National Meter Co., N. Y.
 Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
- METERS, ELECTRIC (WATTHOUR)**
 Duncan Elec. Mfg. Co., LaFayette, Ind.
 General Elec. Co., Schenectady, N. Y.
 Sangamo Elec. Co., Springfield, Ill.
 Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.
- METERS, GAS**
 American Meter Co., N. Y.
 Bailey Meter Co., Cleveland, O.
 Bailey Iron Fdry., Providence, R. I.
 Cleveland Gas Meter Co., Cleveland, O.
 Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
- METERS, WATER, OIL & GASOLINE**
 *Neptune Meter Co., N. Y.
 *Union Water Meter Co., Worcester, Mass.
 Badger Meter Mfg. Co., Milwaukee
 Buffalo Meter Co., Buffalo, N. Y.
 Federal Meter Corp'n., E. Orange, N. J.
 Gamon Meter Co., Newark, N. J.
 Hersey Mfg. Co., Boston, Mass.
 National Meter Co., N. Y.
 Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
 Thomson Meter Corp., New York
 Worthington Pump & Mch. Corp., N. Y.
- METERS, WATER (VENTURI TYPE)**
 Builders Iron Fdry., Providence, R. I.
 Simplex Valve & Meter Co., Phila., Pa.
- MICROMETERS**
 *Lufkin Rule Co., Saginaw, Mich.
- MIXERS, CONCRETE** (See Concrete Mixers)
- MIXERS, GROUT**
 *Lakewood Eng. Co., Cleveland, O.
 *T. L. Smith Co., Milwaukee, Wis.
 *Union Iron Wks., Inc., Hoboken, N. J.
 Kent Mach. Co., Kent, O.
- MIXERS, HOT**
 *Barber Asphalt Co., Phila., Pa.
- MIXERS, MORTAR**
 *Atlas Eng. Co., Milwaukee.
 *Blaw-Knox Co., Pittsburgh, Pa.
 *Blystone Mfg. Co., Cambridge Spgs., Pa.
 *Helmsel St. Form & Ir. Co., Warren, O.
 *Jaeger Machine Co., Columbus, Ohio.
 *Lakewood Eng. Co., Cleveland, O.
 *John Lauson Mfg. Co., New Holstein, Wis.
 *Ransome Conc. Mch. Co., Dunellen, N. J.
 *T. L. Smith Co., Milwaukee, Wis.
 Anchor Mfg. Co., Chicago

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*

ONLY THE BARBER-GREENE HAS THE DISC-FEED AND FLOATING BOOM



Skimming the Ground There's No Shovel Clean-up

The B-G disc-feed can be set to skim the ground—missing the dirt at the bottom of the pile—and yet digging so neatly that no shovel clean-up is necessary. And it doesn't ask the buckets to dig for their loads.

Thanks to the floating boom, the disc-feed sails smoothly over rough going, without transmitting strains to the loader chassis.

On both the "25" and the larger "42"—it means loading speed and longer life.

BARBER-GREENE COMPANY

485 W. PARK AVE.

AURORA, ILLINOIS



Barber-Greene Loaders

Representatives in 50 Cities

Disc Feed Loaders	Vertical Boom Ditchers
Standardized Portable and Permanent Belt Conveyors	
Snow Loaders	Car Unloaders
	Coal Loaders

Yes—we would like you to mention the CONTRACTORS AND ENGINEERS MONTHLY.

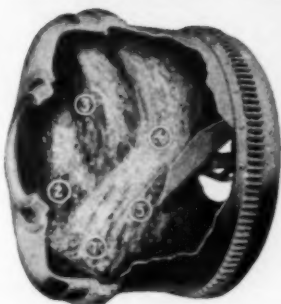
Where to Purchase

- Archer Iron Wks., Chicago.
C. H. & E. Mfg. Co., Milwaukee, Wis.
Construction Machy. Co., Waterloo, Ia.
Kent Mach. Co., Kent, O.
Kiel Mach. Co., Kiel, Wis.
Knickerbocker Co., Jackson, Mich.
Lansing Co., Lansing, Mich.
Marab-Capron Co., Chicago
Meill-Blumberg Co., New Holstein, Wis.
Standard Scale & Sup. Corp., Pittsburgh
Talbot-Flood Mfg. Co., Kansas City, Mo.
- MIXERS, PLASTER**
*Atlas Eng. Co., Milwaukee.
*Blystone Mfg. Co., Cambridge Spgs., Pa.
*Jaeger Machine Co., Columbus, Ohio
*John Lauson Mfg. Co., New Holstein, Wis.
Anchor Mfg. Co., Chicago.
Essick & Co., Los Angeles, Cal.
Knickerbocker Co., Jackson, Mich.
Marab-Capron Co., Chicago
Meill-Blumberg Co., New Holstein, Wis.
Standard Scale & Sup. Corp., Pittsburgh
Talbot-Flood Mfg. Co., Kansas City, Mo.
- MORTAR BOXES**
*General Wheelbarrow Co., Cleveland, O.
*Heitsel Stl. Form & Ir. Co., Warren, O.
*Jos. Honhorst Co., Cincinnati, O.
*Littleford Bros., Cincinnati
Anchor Mfg. Co., Chicago, Ill.
Canton Art Metal Co., Canton, O.
- MORTISES, ELECTRIC**
R. L. Carter Co., Phoenix, N. Y.
Wappat Gear Wks., Pittsburgh.
- MOTORCYCLES**
Cleveland Motorcycle Co., Cleveland, O.
Excelsior Motor Mfg. & Supply Co., Chicago
Harley-Davidson Motor Co., Milwaukee
Indian Motorcycle Co., Springfield, Mass.
- MOTORS, ELECTRIC** (See Electric Generators and Motors)
- MOTORS, GASOLINE** (See Engines, Gas and Gasoline)
- MOTOR TRUCKS**
*Graham Bros., Detroit
*Mack Trucks, Inc., New York
Amer-La France & Foamite Corp., New York
Acme Motor Truck Co., Cadillac, Mich.
Aiterbury Motor Car Co., Buffalo, N. Y.
Autocar Co., Ardmore, Pa.
Bassener Motor Truck Co., Grove City, Pa.
Brookway Motor Truck Co., Cortland, N. Y.
Clydesdale Motor Truck Co., Clyde, O.
Commerce Motor Trk. Co., Ypsilanti, Mich.
Diamond T. Motor Car Co., Chicago
Duplex Truck Co., Lansing, Mich.
Federal Motor Truck Co., Detroit
Ford Motor Co., Detroit
Four Wheel Drive Auto Co., Clintonville, Wis.
Garford Truck Co., Lima, O.
General Motors Truck Co., Chicago.
Gramm Motors, Inc., Lima, O.
The Hug Co., Highland, Ill.
Indiana Truck Corp., Marion, Ind.
Int. Harvester Co., Chicago
Kelly Springfield Truck & Bus Corp., Springfield, O.
Learabee-Deyo Motor Tr. Co., Blaghamton, N. Y.
Luedinghaus-Espenchied Wagon Co., St. Louis.
Pierce-Arrow Motor Car Co., Buffalo
Republic Truck Sales Corp., Alma, Mich.
Relays Motors Corp., Wabash, Ind.
Standard Motor Truck Co., Detroit
Sterling Motor Truck Co., Milwaukee
Stewart Motor Corp., Buffalo, N. Y.
Toppins Trac. Truck Co., Appleton, Wis.
Traffic Motor Tr. Co., St. Louis, Mo.
United Motor Products Co., Grand Rapids, Mich.
U. S. Motor Truck Co., Cincinnati, O.
- Walter Motor Truck Co., L. I. City, N.Y.
White Co., Cleveland
Yellow Truck & Coach Mfg. Co., Chicago
- MOULDS, CONCRETE**
*Blaw-Knox Co., Pittsburgh, Pa.
*Heitsel St. Form & Ir. Co., Warren, O.
- MUCKING MACHINES**
Hear Shovel Co., Duluth, Minn.
- NUMBERS, HOUSE** (See House Numbers)
- OAKUM**
Oswald Acetylene Co., Long Island City, N. Y.
- OILS, ROAD**
*Barber Asphalt Co., Phila., Pa.
*Barrett Co., N. Y.
*Standard Oil Co. (Indiana), Chicago
*Standard Oil Co. (N. Y.), N. Y.
Atl. Ref. & Asph. Corp., Phila., Pa.
Headley Good Roads Co., Phila., Pa.
Pioneer Asph. Co., Lawrenceville, Ill.
Standard Oil Co. (La.), N. Orleans, La.
Standard Oil Co. (N. J.), Newark, N. J.
Texas Company, N. Y.
- OXY-ACETYLENE APPARATUS**
*Alex. Milburn Co., Baltimore, Md.
Carbic Mfg. Co., Duluth.
*Oswald Acetylene Co., Long Island City, N. Y.
- PAINTING, WATER PIPE**
The Leadite Co., Phila., Pa.
United Lead Company, N. Y.
- PAINTING MACHINERY**
*Alex. Milburn Co., Baltimore, Md.
Binks Spray Eq. Co., Chicago
Chicago Pneum. Tool Co., New York
De Vilbiss Mfg. Co., Toledo, O.
Eclipse Air Brush Co., Newark, N. J.
W. H. Matthews Corp., St. Louis
Pasche Air Brush Co., Chicago
Simons "Airt Spray Brush Co., Dayton, O.
Spraco Painting Equip. Co., Boston
- PAINTS, METAL PROTECTION**
*Barber Asphalt Co., Phila., Pa.
*Barrett Co., N. Y.
*Philip Carey Co., Cincinnati, O.
*Jos. Dixon Crucible Co., J. City, N. J.
Acme White Ld. & Col. Wks., Detroit
Berry Bros., Detroit
Cook Paint & Varnish Co., K. City, Mo.
Detroit Graphite Co., Detroit
Detroit White Lead Wks., Detroit
E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del.
Euclid Chemical Co., Cleveland, O.
Minwax Co., N. Y.
Protexol Corp., Kenilworth, N. J.
Ruberoid Co., N. Y.
Semet-Solvay Co., N. Y.
Servicised Products Corp'n., Chicago
Sherwin-Williams Co., Cleveland, O.
L. Sonneborn Sons, N. Y.
Toch Bros., N. Y.
Tropical Paint & Oil Co., Cleveland, O.
Trucon Laboratories, Detroit
- PAPERS, BLUE PRINT**
Ind'p'lis Blue Print & Supply Co., Ind'p'lis, Ind.
- PARK BENCHES**
*Van Dorn Iron Wks. Co., Cleveland
Bausman Mfg. Co., Millersville, Pa.
Logan Co., Louisville, Ky.
Fred J. Meyers Mfg. Co., Hamilton, O.
Stewart Iron Wks. Co., Cincinnati, O.
- PAVEMENT BREAKERS** (See Breakers)
- PAVING AND ROAD ROLLERS** (See Road and Paving Rollers)
- PAVING BLOCKS, CRESOTED WOOD** (See Cresoted Blocks)
- PAVING BRICK**
Alton Brick Co., Alton, Ill.
Buckeye Shale Brick Co., Cleveland, O.
Buffalo Brick Co., Buffalo, Kans.
Cleveland Brick & Clay Co., Cleveland, O.
Collinwood Shale Brick Co., Cleveland, O.
Corry Brick & Tile Corp., Corry, Pa.
Crescent Brick Co., Pittsburgh, Pa.
Georgia Vit. Brick Co., Augusta, Ga.
Globe Brick Co., E. Liverpool, O.
Hammond Fire Brick Co., Fairmount, W. Va.
Hixylvania Coal Co., Columbus, O.
Hocking Val. Brick Co., Columbus, O.
McAvoy Vit. Brick Co., Phila., Pa.
Mayer Brick Co., Bridgeville, Pa.
Metropolis Pav. Br. Co., Pittsb'h, Kan.
Metropolitan Pav. Br. Co., Canton, O.
Mineral Wells Br. Co., Mineral Wells, Tex.
Moberly Pav. Br. Co., Moberly, Mo.
Murphyshore Pav. Brick Co., Murphysboro, Ill.
Nelsonville Brick Co., Nelsonville, O.
Patton Clay Mfg. Co., Patton, Pa.
Paxton Brick Co., Watsontown, Pa.
Peoples Pav. Br. Co., Portsmouth, O.
Peoria Brick & Tile Co., Peoria, Ill.
Purinton Pav. Br. Co., Galesburg, Ill.
Rose Shale Brick Co., Veedersburg, Ind.
Russell Clay Mfg. Co., Alton, Ala.
So. Clay Mfg. Co., Chattanooga, Tenn.
Spfld. Pav. Br. Co., Springfield, Ill.
Sterling Brick Co., Olean, N. Y.
Streator Clay Mfg. Co., Streator, Ill.
Terre Haute Vit. Brick Co., Terre Haute, Ind.
Thornton Fire Brick Co., Clarksburg, W.V.
Thurber Brick Co., Thurber, Tex.
Toronto Fire Clay Co., Toronto, O.
Trinidad Br. & Tile Co., Trinidad, O.
United Clay Prod. Corp., Kansas City
West'n Shale Prod. Co., Ft. Scott, Kan.
Westport Pav. Br. Co., Westport, Md.
- PAVING MACHINERY** (See Road and Paving Machinery)
- PAVING GUARDS, STEEL**
W. S. Godwin Co., Baltimore, Md.
- PAVING MATERIALS** (See "Asphalt," "Paving Brick," "Granite Block," etc.)
- PAVING MIXERS** (See Concrete Mixers)
- PAVING TOOLS**
*Aerold Burner Co., West New York, N.J.
*Barber Asphalt Co., Phila., Pa.
*Connery & Co., Phila., Pa.
*Jos. Honhorst Co., Cincinnati, O.
*Littleford Bros. Co., Cincinnati, O.
*Union Iron Wks., Inc., Hoboken, N. J.
*Warren Bros. Co., Boston
W. H. Anderson Tl. & Sup. Co., Detroit
Chausse Oil Burner Co., Elkhart, Ind.
F. D. Cummer & Sons Co., Cleveland, O.
Hauck Mfg. Co., Bklyn, N. Y.
- PERFORATED METALS**
*Littleford Bros., Cincinnati
Allis-Chalmers Mfg. Co., Milwaukee
Hendrick Mfg. Co., Carbondale, Pa.
- PICKS**
Beall Tool Co., E. Alton, Ill.
Hubbard Co., Pittsburgh, Pa.
Independent Pneum. Tool Co., Chicago
Iron City Tool Wks., Pittsburgh
Klein-Logan Co., Pittsburgh
Oliver Ir. & St. Corp., Pittsburgh, Pa.
Verona Tool Wks., Verona, Pa.
Warren Tool & Forge Co., Warren, O.
Warwood Tool Co., Wheeling, W. Va.
Wyoming Shovel Wks., Wyoming, Pa.
- FILE DRIVERS**
*Clyde Ir. Wks. Sales Co., Duluth, Minn.
*Erie Steam Shovel Co., Erie, Pa.

If you find any errors or omissions in this Where to Purchase list, please send corrections to
CONTRACTORS & ENGINEERS MONTHLY

KOEHRING

Re-mixing Action



ONLY the Koehring sends materials through the mixing action, and then returns them to the charging side of the drum, and sends them through the mixing action again, and again — a *clean cut, fast re-mixing action!*

Every grain of sand, every fragment of stone is thoroughly coated with cement

Koehring re-mixing action is alone made possible by the Koehring construction which pivots the discharge chute far enough inside the drum so that, in reversed position it scatters and sprays material *back to the charging side* of the drum, as materials are violently projected down upon it from the pick-up buckets at the drum top!

This double spraying, scattering action prevents separation of aggregate according to size! Koehring mixed concrete is *stronger concrete — uniform to the last shovelful of every batch — plastic — dominant strength concrete!*

This means security against extended mixing period when concrete is under rigid inspection, and when mixing time is fixed according to uniformity, plasticity and strength of concrete!

Write for Paver Catalog No. P-6



KOEHRING COMPANY MILWAUKEE WISCONSIN

PAVERS, MIXERS—GASOLINE SHOVELS, CRANES AND DRAGLINES

Sales Offices and Service Warehouses in all principal cities
Foreign Department, Room 1370, 30 Church St., New York City.
Mexico, F. S. Lopez, Cinco De Mayo 11, Mexico, D. F.



*And Besides the Koehring Is Fast!
Fast As a Unit!*

*Fast in the high speed succession of batch after batch through the mixer! Fast in second-saving control! Beyond all question the Koehring is the **High Speed Paving Unit** — the extra yardage mixer for record-breakers!*

SIZES

Pavers — 7-E, 13-E, 27-E. Auxiliary equipment and choice of power to suit individual needs. Complies with A. O. C. Standards.
Construction Mixers — 10-E, 14-E, 21-E, 28-E. Steam, gasoline or electric power. Mounted on trucks or skids. Rubber tired wheels optional. 28-E on skids only. Complies with A. O. C. Standards.
Handie Mixers — 3-S, 7-S — 5-S single cylinder, 7-S two four cylinder gasoline engine. Power charging skip, or low charging hopper and platform. Rubber tired steel disc wheels or steel rimmed wheels. Complies with A. O. C. Standards.

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

Where to Purchase

- *McKiernan-Terry Drill Co., N. Y.
 *Mead-Morrison Mfg. Co., E. Boston
 *Union Iron Wks., Inc., Hoboken, N. J.
 Industrial Wks., Bay City, Mich.
 Lidgerwood Manufacturing Co., N. Y.
 McMyler Interstate Co., Cleveland, O.
- PILE-HAMMERS, STEAM**
 *Clyde Ir. Wks. Sales Co., Duluth, Minn.
 *McKiernan-Terry Drill Co., N. Y.
 *Union Iron Wks., Inc., Hoboken, N. J.
 *Wemlinger, Inc., N. Y.
 Industrial Wks., Bay City, Mich.
 Nil. Hoisting Eng. Co., Harrison, N. J.
 Vulcan Iron Wks., Chicago
- PILING, CONCRETE**
 MacArthur Conc. Pile & F'd'n. Co., N.Y.
 Raymond Conc. Pile Co., N. Y.
- PILING, INTERLOCKING STEEL**
 Bethlehem Steel Co., Bethlehem, Pa.
 Carnegie Steel Co., Pittsburgh, Pa.
- PILING, STEEL SHEET**
 *Wemlinger, Inc., N. Y.
 Bethlehem Steel Co., Bethlehem, Pa.
- PIPE CAST IRON**
 *Central Fdry. Co., N. Y.
 *U. S. Cast Ir. Pipe & Fdry. Co., Burlington, N. J.
 Am. Cast Ir. Pipe Co., Birmingham, Ala.
 J. B. Clow & Sons, Chicago
 Donaldson Iron Co., Emaus, Pa.
 John Fox & Co., N. Y.
 Glamorgan Pipe & Fdry. Co., Lynchburg, Va.
 Lynchburg Fdry. Co., Lynchburg, Va.
 McWane C. I. Pipe Co., Birmingham, Ala.
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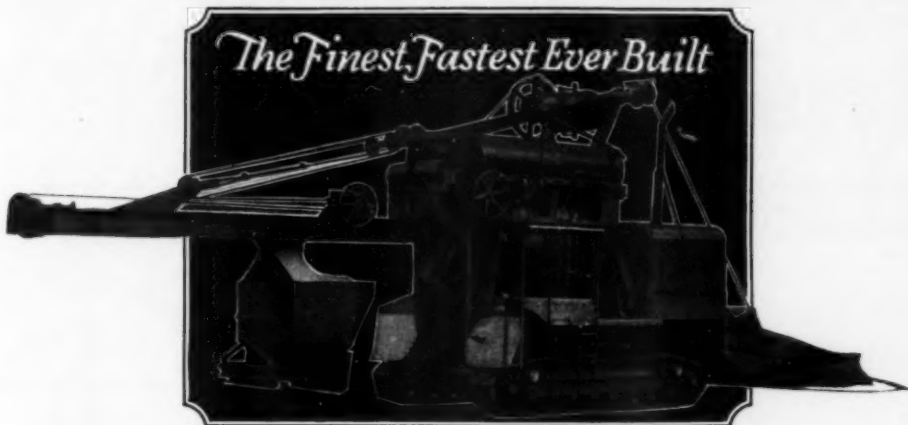
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ROAD AND PAVING MACHINERY

*Acme Rd. Mach. Co., Frankfort, N. Y.
*Austin-West'n Rd. Mch. Co., Chicago.
*Baker Mfg. Co., Springfield, Ill.
*Barber Asphalt Co., Phila., Pa.
*Blaw-Knox Co., Pittsburgh, Pa.
*Buffalo-Springfield Roller Co., Springfield, O.
*Caterpillar Tractor Co., San Leandro, Cal. and Peoria, Ill.
*Connery & Co., Inc., Phila., Pa.
*Cleveland Tractor Co., Cleveland, O.
*Euclid Cr. & Hst. Co., Euclid Village, O.
*Gallon Jr. Wks. & Mfg. Co., Gallon, O.
*Good Rds. Mach. Co., Kennett Sq., Pa.
*Geo. Haisa Mfg. Co., N. Y.
*Hellett St. Form & Ir. Co., Warren, O.
*J. C. Honhorst Co., Cincinnati, O.
*Kinney Mfg. Co., Boston.
*Koehring Co., Milwaukee.
*Lakewood Eng. Co., Cleveland, O.
*Littleford Bros., Cincinnati, O.
*Mack Trucks, Inc., N. Y.
*Russell Grader Mfg. Co., Minneapolis.
*Gustav Schaefer Wagon Co., Cleveland.
*T. L. Smith Co., Milwaukee.
*Spears-Wellis Mch. Co., Oakland, Cal.
J. D. Adams & Co., Indianapolis, Ind.
Beach Mfg. Co., Charlotte, Mich.
Chausse Oil Burner Co., Elkhart, Ind.
F. D. Cummer & Son Co., Cleveland, O.
Easton Car & Const. Co., Easton, Pa.
C. D. Edwards Mfg. Co., Albert Lea, Minn.
Equitable Asph. Maint. Co., Kans. C. Mo.
Erie Mach. Shops, Erie, Pa.
J. D. Farney Mfg. Co., Cleveland, O.
Gilbert Mfg. Co., Aberdeen, S. Dak.
Little Red Wagon Mfg. Co., Omaha.
Shaw-Enoch Tractor Co., Minneapolis.
Slusser-McLean Scraper Co., Sidney, O.
Universal Rd. Mch. Co., Kingston, N. Y.

ROAD AND PAVING ROLLERS

*Acme Road Mach. Co., Frankfort, N. Y.
*Austin-West'n Rd. Mch. Co., Chicago.
*Barber Asphalt Co., Phila., Pa.
*Buffalo-Springfield Roller Co., Springfield, O.
*Gallon Jr. Wks. & Mfg. Co., Gallon, O.
*Good Rds. Mach. Co., Kennett Sq., Pa.
*Huber Mfg. Co., Marion, O.
*Kinney Standards, Inc., Brooklyn, N. Y.
Austin Mfg. Co., Chicago.
Banting Mfg. Co., Toledo, O.
Beach Mfg. Co., Charlotte, Mich.
J. I. Case Threshing Mach. Co., Racine, Wis.
Erie Mach. Shops, Erie, Pa.
Horst & Strieter Co., Davenport, Ia.
Wehr Co., Milwaukee.

ROCK CRUSHERS AND PULVERIZERS (See Crushers)

ROCK DRILLS (See Drills, Rock)

ROLLERS, LAWN, TRACTOR POWER

*Kinney Standards, Inc., Brooklyn, N. Y.

ROOFING, ARBESTOS, ASPHALT, COMPOSITION, TILES, ETC.

*Barber Asphalt Co., Phila., Pa.
*Barrett Co., N. Y.
*Philip Carey Co., Cincinnati, O.
*Standard Oil Co. (Indiana), Chicago.
Amer. Cem. Tile Mfg. Co., Pittsburgh.
Atlantic Ref. & Asph. Corp., Phila., Pa.
Beaver Prod. Co., Inc., Buffalo, N. Y.
Bird & Son, Inc., E. Walpole, Mass.
Curtain-rod Products Corp., N. Y.
Chatfield Mfg. Co., Cincinnati, O.
Edwards Mfg. Co., Cincinnati, O.
Euclid Chemical Co., Cleveland.
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The Lehon Co., Chicago.
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Nat'l Roofing Co., Tonawanda, N. Y.
Nat'l Sheet Metal Roofing Co., Jersey City, N. J.

Ruberoid Co., N. Y.
Rall Mountain Co., Chicago.
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Texas Co., N. Y.
Western Elastite Roofing Co., Denver.

ROOFING, METAL

*Blaw-Knox Co., Pittsburgh, Pa.
*Truscon Steel Co., Youngstown, O.
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Amer. Sheet & Tin Plate Co., Pittsb'h.
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Edwards Mfg. Co., Cincinnati, O.
Klauser Mfg. Co., Dubuque, Ia.
Milwaukee Corr. Co., Milwaukee.
Republic Jr. & Stl. Co., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, O.

ROOFING KETTLES (See Kettles)

ROOSTERS

*Ted Carr & Co., Chicago.
Lakewood Eng. Co., Cleveland.

ROPE, MANILA

Amer. Mfg. Co., B'klyn, N. Y.
Columbian Rope Co., Auburn, N. Y.
Cupples Cordage Co., B'klyn, N. Y.
Hooven & Allison Co., Xenia, O.
R. A. Kelly Co., Xenia, O.
N. Bedford Cordage Co., N. Bedford, Mass.
Peoria Cordage Co., Peoria, Ill.
Plymouth Cordage Co., N. Plymouth, Mass.
Portland Cordage Co., Portland, Ore.
Tubbs Cordage Co., San Francisco.
Wall Rope Wks., N. Y.
Waterbury Co., N. Y.
Whitlock Cordage Co., N. Y.

ROPE, WIRE, HOISTING, HAULAGE

*American Steel & Wire Co., Chicago.
*Wm'sport Wire Rope Co., Wm'sport, Pa.
Amer. Cable Co., Inc., N. Y.
Broderick & Bascom Rope Co., St. Louis, Mo.
Fischer & Hayes Rope & Steel Co., Chicago.
Hazard Wire Rope Co., Wilkesbarre, Pa.
A. Lechen & Sons Rope Co., St. Louis.
Macwhitty Co., Kenosha, Wis.
J. A. Reibling's Sons Co., Trenton, N. J.
Upson-Walton Co., Cleveland, O.
Waterbury Co., N. Y.
Wickwire Spencer Steel Co., N. Y.

RUBBER TIRES (See Tires)

RULES

*Larkin Rule Co., Saginaw, Mich.

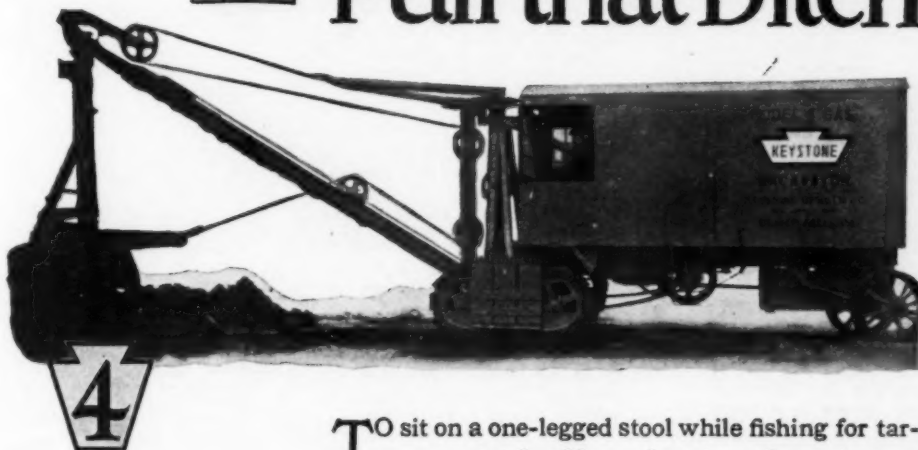
SALAMANDERS

*Aeroll Burner Co., West New York, N. J.
*General Wheelbarrow Co., Cleveland, O.
*Jos. Honhorst Co., Cincinnati, O.
*Littleford Brothers, Cincinnati, O.
Hauk Mfg. Co., B'klyn, N. Y.
Jackson Mfg. Co., Harrisburg.

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* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*

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SAW RIGS, PORTABLE

*Amer. Saw Mill Mach. Co., Hackettstown, N. J.

*Witte Eng. Wks., Kans. City, Mo.
Beach Mfg. Co., Montrose, Pa.
C. H. & E. Mfg. Co., Milwaukee.
Knickerbocker Co., Jackson, Mich.
Leach Co., Oshkosh, Wis.
Jones Superior Mach. Co., Chicago.

SAWS, HAND, POWER

*Witte Eng. Wks., Kans. City, Mo.
Electro-Magnetic Tool Co., Chicago.
Flexway Corp., Cincinnati, O.
Ingersoll-Rand Co., New York
Michel Elec. Hand Saw Co., Chicago.
Porter Cable Mach. Co., Syracuse
F. L. Rogers & Co., Chicago.
Wappat Gear Wks., Pittsburgh, Pa.

SCARIFIERS

*Acme Rd. Mach. Co., Frankfort, N. Y.
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*Barber Asphalt Co., Phila., Pa.
*Buffalo-Springfield Roller Co., Springfield, O.

*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*Good Rds. Mach. Co., Kennett Sq., Pa.
*Huber Mfg. Co., Marion, O.
*Rome Mfg. Co., Rome, N. Y.
*Russell Grader Mfg. Co., Minneapolis.
Austin Mfg. Co., Chicago.
Banting Mfg. Co., Toledo, O.
C.D. Edwards Mfg. Co., Albert Lea, Minn.
Klauer Mfg. Co., Dubuque, Iowa.
Universal Rd. Mch. Co., Kingston, N.Y.

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*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*Russell Grader Mfg. Co., Minneapolis.
Shunk Mfg. Co., Bucyrus, O.

SCOOPS, SKIMMER & TRENCH

*Bay City Dr. Wks., Bay City, Mich.
*Keystone Driller Co., Beaver Falls, Pa.

SCRAPERS, DRAGLINE

*Erie Steam Shovel Co., Erie, Pa.
*Link-Belt Co., Chicago.
*Russell Grader Mfg. Co., Minneapolis.
*Sanerman Bros., Chicago.
Austin Mfg. Co., Chicago.
Beach Mfg. Co., Charlotte, Mich.

SCRAPERS, POWER DRAG

*Erie Steam Shovel Co., Erie, Pa.
*Russell Grader Mfg. Co., Minneapolis.
*Sanerman Bros., Chicago.
Austin Mfg. Co., Chicago.

SCRAPERS, ROAD (See Road Scrapers)

SCRAPERS, SELF-LOADING

*Baker Mfg. Co., Springfield, Ill.
*Euclid Cr. & Hst. Co., Euclid Village, O.
*Miami Trailer-Scraper Co., Troy, O.
*Russell Grader Mfg. Co., Minneapolis.
*Gustav Schaefer Wagon Co., Cleveland.
Davenport Mfg. Co., Los Angeles, Cal.
Perry Co., Sidney, Ohio.
Roderick Lean Co., Mansfield, O.
Shaw-Enoch Tractor Co., Minneapolis.

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*Acme Road Machy. Co., Frankfort, N. Y.
*Atlas Eng. Co., Milwaukee, Wis.
*Austin-Western Rd. Mch. Co., Chicago.
*Chain Belt Co., Milwaukee, Wis.
*Chicago Automatic Conv. Co., Chicago.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*Good Rds. Mch. Co., Kennett Sq., Pa.
*Hais Mfg. Co., N. Y.
*Link-Belt Co., Chicago.
*Littlerford Bros., Cincinnati, O.
*Russell Grader Mfg. Co., Minneapolis.
*Smith Eng. Wks., Milwaukee
*Allis-Chalmers Mfg. Co., Milwaukee.
Austin Mfg. Co., Chicago.
C. O. Bartlett & Snow Co., Cleveland, O.
Beach Mfg. Co., Charlotte, Mich.
Brown Hatg. Machy. Co., Cleveland, O.

Deister Concentrator Co., Ft. Wayne, Ind.
Gifford-Wood Co., Hudson, N. Y.
Hendrick Mfg. Co., Carbondale, Pa.
Jeffrey Mfg. Co., Columbus, O.
Lyle Culr. & Rd. Equip. Co., Minneapolis, Minn.

Morrow Mfg. Co., Wellston, O.
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Robins Conv. Belt Co., N. Y.
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Universal Crusher Co., Cedar Rapids, Ia.
Universal Rd. Mach. Co., Kingston, N.Y.
Webster Mfg. Co., Chicago.
Weller Mfg. Co., Chicago.
Wickwire Spencer Steel Co., N. Y.

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*Link-Belt Co., Philadelphia.
Dorr Co., New York.
Green Bay Fdry. & Mach. Wks., Green Bay, Wis.
Sanitation Corp'n., N. Y.
Simplex Ejector Co., Chicago.

SEWAGE DISINFECTION

*Wallace & Tiernan Co., Inc., Newark, N. J.

SEWAGE DISPOSAL APPARATUS

*Link-Belt Co., Chicago.
*Pacific Flush Tank Co., Chicago & N. Y.
Dorr Co., N. Y.
Sanitation Corp'n., N. Y.
Simplex Ejector Co., Chicago.

SEWAGE EJECTORS

*Pacific Flush Tank Co., Chicago & N. Y.
Sanitation Corp'n., N. Y.
Simplex Ejector Co., Chicago.
Yeomans Bros. Co., Chicago.

SEWAGE PUMPS (See Pumps)

SEWER BLOCKS, SEGMENT

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Cannelton Sewer Pipe Co., Cannelton, Ind.
Denver Sewer Pipe & Clay Co., Denver, Col.
W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
Evans & Howard Fire Brick Co., St. Louis, Mo.
Laclede Christy Clay Prod. Co., St. Louis, Mo.
Macom Sewer Pipe Wks., Macomb, Ill.
Pacific Clay Prod. Co., Los Angeles, Cal.
Red Wing Sewer Pipe Co., Red Wing, Minn.
Robinson Clay Prod. Co., Akron, O.
Standard Fire Brick & Sewer Pipe Co., Pueblo, Col.

SEWER BRACES

*Templeton, Kenly & Co., Chicago

SEWER CLEANING APPARATUS

Atis Corp., New York.
F. Bissell Co., Toledo, O.
Champion Corp., Hammond, Ind.
Self Propelling Nozzle Co., N. Y.
Turbine Sewer Mach. Co., Milwaukee.

SEWER PIPE AND DRAIN TILE

American Vit. Prod. Co., Akron, O.
Blackmer & Post Pipe Co., St. Louis.
Wm. E. Dee Co., Chicago.
Denver Sewer Pipe & Clay Co., Denver, Col.
W. S. Dickey Clay Mfg. Co., K. City, Mo.
Evans & Howard Fire Brick Co., St. Louis.
Logan Clay Prod. Co., Logan, O.
Ohio Vit. Pipe Co., Uhrichsville, O.
Patton Clay Mfg. Co., Patton, Pa.
Red Wing Sewer Pipe Co., Red Wing, Minn.
Robinson Clay Prod. Co., Akron, O.
Streator Clay Mfg. Co., Streator, Ill.

SEWER PIPE FORMS

*Haltzel Stl. Form & Ir. Co., Warren, O.
Raber & Lang Mfg. Co., Kendallville, Ind.

SEWER PIPE JOINT COMPOUNDS

*Pacific Flush Tank Co., Chicago & N. Y.
G. K. Sales Agency, Macungie, Pa.
Ruberoid Co., N. Y.
Servicised Prod. Corp., Chicago
Conc. Form Co., Inc., Syracuse, N. Y.
Quinn Wire & Iron Wks., Boone, Ia.

SEWER RODS

F. Bissell Co., Toledo, O.
Champion Corp., Hammond, Ind.
Luck Sewer Equip. Co., Chicago.
Turbine Sewer Mach. Co., Milwaukee.

SHARPENERS, DRILL STEEL

*Gardner-Denver Co., Denver, Col.
*Hardscog Wonder Dr. Co., Ottumwa, Ia.
*Sullivan Machy Co., Chicago
Ingersoll-Rand Co., New York

SHINGLES, METAL

Aluminum Co. of Am., Pittsburgh, Pa.
Berger Mfg. Co., Canton, O.
Edwards Mfg. Co., Cincinnati, O.
Klauer Mfg. Co., Dubuque, Ia.
Milwaukee Corrugating Co., Milwaukee.
Nat'l Sheet Metal Roofing Co., Jersey City, N. J.
Newport Rolling Mill Co., Newport, Ky.
Penn Metal Co., Boston.
Tiffin Art Metal Co., Tiffin, O.
Wheeling Metal Mfg. Co., Wheeling, W. Va.

SHORES

Concrete Eng. Co., Omaha, Neb.
Dayton Sure Grip & Shore Co., Dayton, O.
M. & M. Form Clamp Co., Minneapolis
The O. D. G. Co., Owensboro, Ky.
H. W. Roos Co., Cincinnati, O.
Roos-Meyer-Hecht Co., Cincinnati, O.
Symons Clamp & Mfg. Co., Chicago.
Universal Form Clamp Co., Chicago.

SHOVELS, CRAWLING TRACTOR

*Erie Steam Shovel Co., Erie, Pa.
*Speeder Mch. Corp., Cedar Rapids, Ia.
*Thew Shovel Co., Lorain, Ohio
Amer. Hat. & Derrick Co., St. Paul.

SHOVELS, ELECTRIC

*Bay City Dredge Wks., Bay City, Mich.
*Koehring Co., Milwaukee, Wis.
*Link-Belt Co., Chicago.
*Speeder Machy. Corp., Cedar Rapids, Ia.
*Thew Shovel Co., Lorain, O.
Amer. Hat. & Derrick Co., St. Paul.
Bucyrus Co., So. Milwaukee, Wis.
Byers Mach. Co., Ravenna, O.
Industrial Wks., Bay City, Mich.
Marion Steam Shovel Co., Marion, O.
Osgood Co., Marion, O.

SHOVELS, GASOLINE

*Bay City Dredge Wks., Bay City, Mich.
*Erie Steam Shovel Co., Erie, Pa.
*General Excavator Co., Marion, O.
*Insley Mfg. Co., Indianapolis.
*Keystone Driller Co., Beaver Falls, Pa.
*Koehring Co., Milwaukee, Wis.
*Link-Belt Co., Chicago.
*Mead-Morrison Mfg. Co., Boston
*Orton Grans & Shovel Co., Chicago.
*Speeder Machy. Corp., Cedar Rapids, Ia.
*Star Drilling Machine Co., Akron, O.
*Thew Shovel Co., Lorain, O.
*Universal Power Shovel Co., Detroit.
Amer. Hat. & Derrick Co., St. Paul.
Amer. Steel Dredge Co., Ft. Wayne, Ind.
Austin Mach. Corp., Muskegon, Mich.
Brown Hatg. Machy. Co., Cleveland, O.
Bucyrus Co., So. Milwaukee, Wis.
Byers Mach. Co., Ravenna, O.
Harnischfeger Corp., Milwaukee, Wis.
Industrial Wks., Bay City, Mich.
Marion Steam Shovel Co., Marion, O.
McMurry Interstate Co., Cleveland, O.
Osgood Co., Marion, O.

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 Anthony Co., Streator, Ill.
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 Mandt Company, Keokuk, Ia.
 Milwaukee Elec. Crane & Mfg. Co., Milwaukee.
 Squier-Rix Co., Milwaukee.

SHOVELS, STEAM

*Erie Steam Shovel Co., Erie, Pa.
 *Keystone Driller Co., Beaver Falls, Pa.
 *Orton Crane & Shovel Co., Chicago.
 *Thew Shovel Co., Lorain, O.
 Amer. Hst. & Derrick Co., St. Paul.
 Bellwood Stm. Shovel Co., Bellwood, Pa.
 Bucyrus Co., So. Milwaukee, Wis.
 Industrial Wks., Bay City, Mich.
 Marion Steam Shovel Co., Marion, O.
 Osgood Co., Marion, O.
 Russell & Co., Massillon, O.

SHOVELS, SPADES & SCOOPS

American Mfg. Co., Chattanooga, Tenn.
 Ames Shovel & Tool Co., Boston.
 Baldwin Tool Wks., Parkersburg, W. Va.
 Beall Bros. Co., Alton, Ill.
 Conneaut Shovel Co., Conneaut, O.
 Hubbard & Co., Pittsburgh, Pa.
 Indiana Shovel Co., New Castle, Ind.
 Jackson Shovel Co., Montpelier, Ind.
 Pittsburgh Shovel Co., Pittsburgh, Pa.
 Russell Shovel Co., Alliquippa, Pa.
 Stevens-Webb Co., Inc., Altoona, Pa.
 Union Furnace Mfg. Co., Altoona, Pa.
 Wood Shovel & Tool Co., Piqua, O.
 Wyoming Shovel Wks., Wyoming, Pa.

SIDEWALK AND ROAD FORMS (See Forms, Concrete)

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Alumoyd Sign & Signal Co., Chicago.
 Auto Sign Display Co. of Mo., St. Louis, Mo.
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 Everna-Century Sign Co., Boston.
 Ingram-Richardson Mfg. Co., Beaver Falls, Pa.
 Lyie-Signa, Minneapolis, Minn.
 Municipal Street Sign Co., N. Y.
 Ohio Traffic Devices Co., Columbus.
 Rochester St. Signal Co., Rochester, N.Y.
 Standard Mfg. Co., Cedar Falls, Ia.
 Union Iron Prod. Co., E. Chicago, Ind.
 Western Stamping & Mfg. Co., St. Paul.

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SMOKE STACKS (See Stacks, Steel)

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 *Cleveland Tractor Co., Cleveland, O.
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 Walter Snow Fighters, L. I. City, N. Y.

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 Cyclone Fence Co., Waukegan, Ill.
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*Littleford Bros., Cincinnati.
 Kinney Mfg. Co., Boston.

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Bean Spray Pump Co., Lansing, Mich.
 Field Force Pump Co., Elmira, N. Y.
 Fitzhenry-Guptill Co., E. Cambridge, Mass.

SPRAY PAINTING MACHINERY (See Painting Machinery)

SPREADERS, STONE

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 *Gallon Ir. Wks. & Mfg. Co., Gallon, O.
 Burch Corp'n., Crestline, O.
 Shaw-Enoch Tractor Co., Minneapolis.
 Universal Road Machy. Co., Kingston, N. Y.

STACKS, STEEL

*Blaw-Knox Co., Pittsburgh, Pa.
 *Connery & Co., Inc., Philadelphia.
 *Heli Co., Milwaukee, Wis.
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 *Jos. Honhorst Co., Cincinnati, O.
 *Littleford Bros., Cincinnati, O.
 Birmingham Tank Co., Birmingham, Ala.
 Canton Art Metal Co., Canton, O.
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 Chicago Bridge & Iron Wks., Chicago.
 Graver Corp., Chicago.
 N. Y. Central Iron Wks. Co., Inc., Hagerstown, Md.
 Tippet & Wood, Phillipsburg, Pa.
 Petroleum Iron Wks. Co., Sharon, Pa.
 Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
 W. B. Scalf & Sons, Pittsburgh, Pa.
 Walsh & Weidner Boiler Co., Chattanooga, Tenn.

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W. E. Caldwell Co., Louisville, Ky.
 Chatta. Bldg. & Tank Co., Chatta, Tenn.
 Chicago Bridge & Iron Wks., Chicago.
 R. D. Cole Mfg. Co., Newnan, Ga.
 Lancaster Iron Wks., Lancaster, Pa.
 Pacific Tank & Pipe Co., San Francisco.
 Petroleum Ir. Wks. Co., Sharon, Pa.
 Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
 Tippet & Wood, Phillipsburg, Pa.
 United Iron Wks., Inc., K. City, Mo.
 Walsh & Weidner Boiler Co., Chatta nooga, Tenn.

STEAM SHOVELS (See Shovels, Steam)

STEAM TURBINES (See Turbines)

STEEL PLATE CONSTRUCTION

*Blaw-Knox Co., Pittsburgh, Pa.
 *Connery & Co., Philadelphia.
 *Heli Co., Milwaukee, Wis.
 *Heltzel St. Form & Ir. Co., Warren, O.
 *Jos. Honhorst Co., Cincinnati, O.
 *Littleford Bros., Cincinnati, O.
 *Union Iron Wks., Inc., Hoboken, N. J.
 Bethlehem Steel Co., Bethlehem, Pa.
 Biggs Boiler Wks., Akron, O.
 Birmingham Tank Co., Birmingham, Ala.
 Chatta. Boiler & Tank Co., Chatta, Tenn.
 Chicago Bridge & Iron Wks., Chicago.
 Graver Corp., E. Chicago, Ind.
 Hendrick Mfg. Co., Carbondale, Pa.
 McClintie-Marshall Co., Pittsburgh, Pa.

N. Y. Central Iron Wks. Co., Inc.

Hagerstown, Md.
 Penna. Bridge Co., Beaver Falls, Ia.
 Petroleum Iron Wks. Co., Sharon, Pa.
 Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
 Riter-Conley Co., Pittsburgh, Pa.
 W. B. Scalf & Sons, Pittsburgh, Pa.
 Walsh & Weidner Bldg. Co., Chatta, Tenn.

STEEL SHEET PILING

*Wemlinger, Inc., N. Y.

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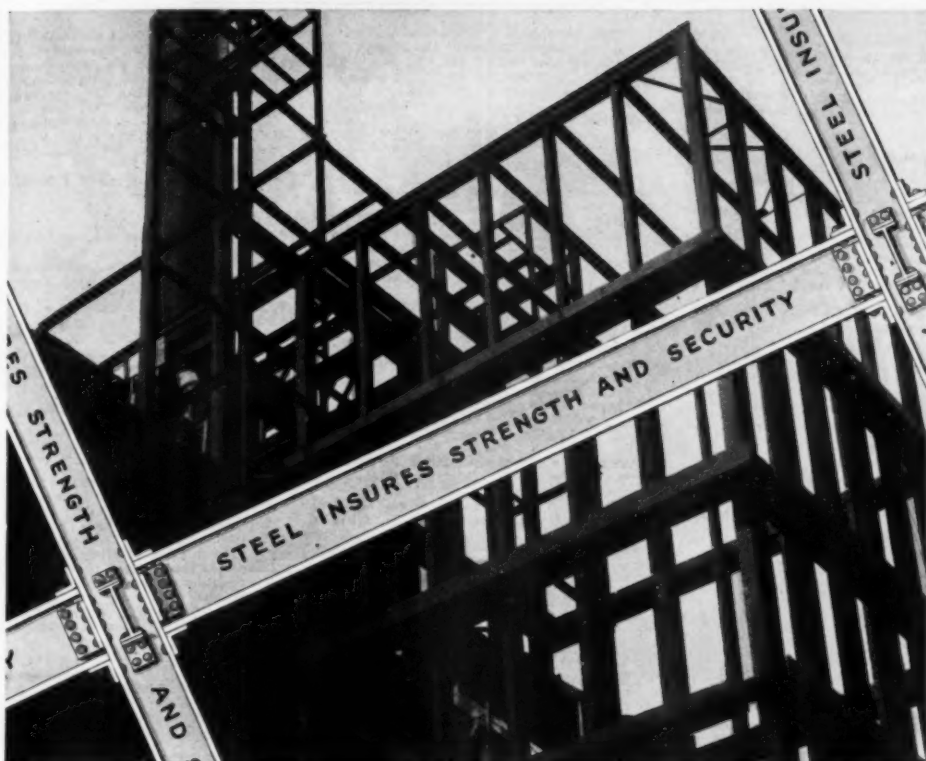
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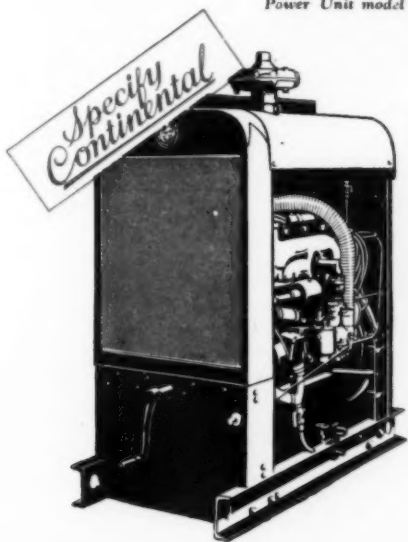
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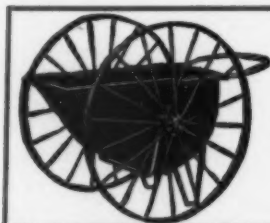
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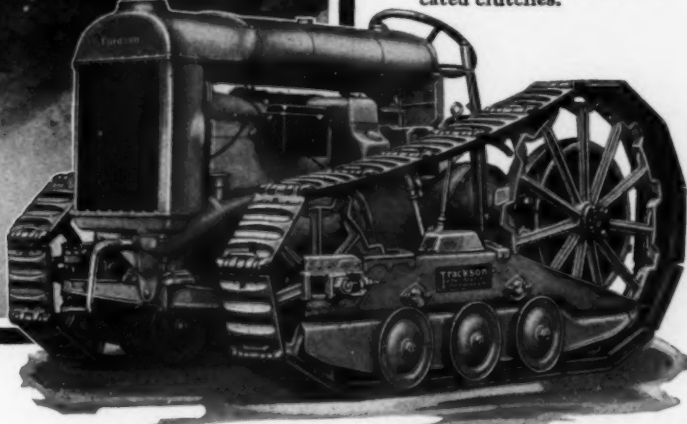
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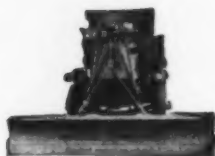
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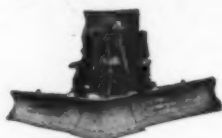
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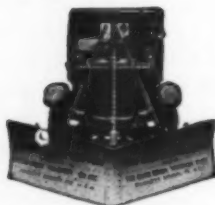
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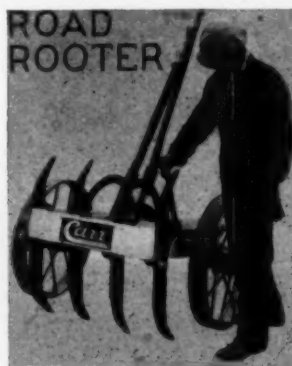
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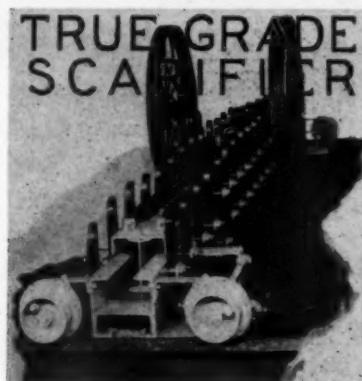
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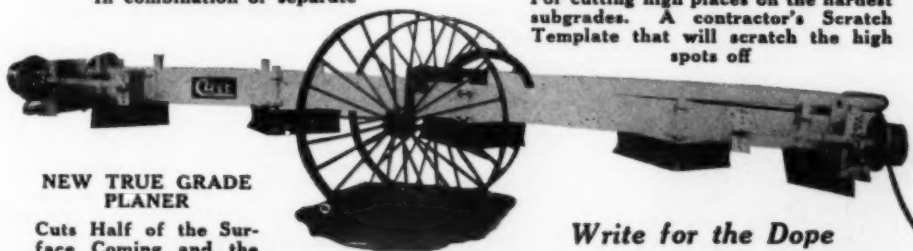
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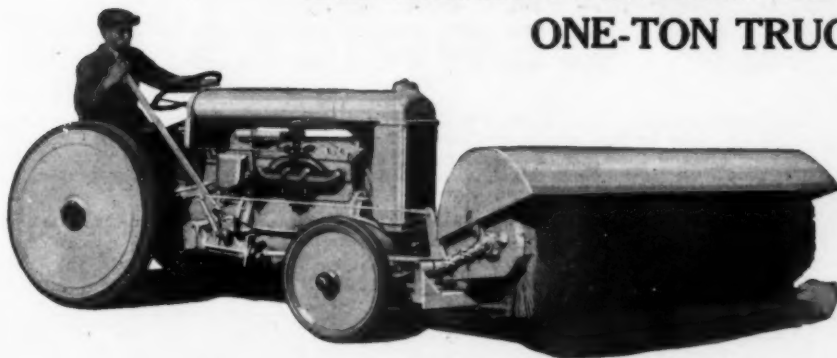
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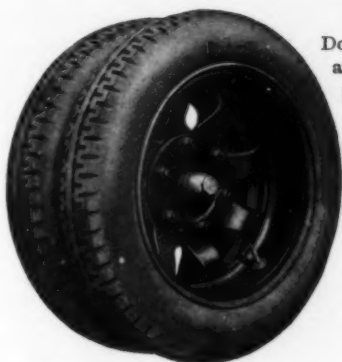


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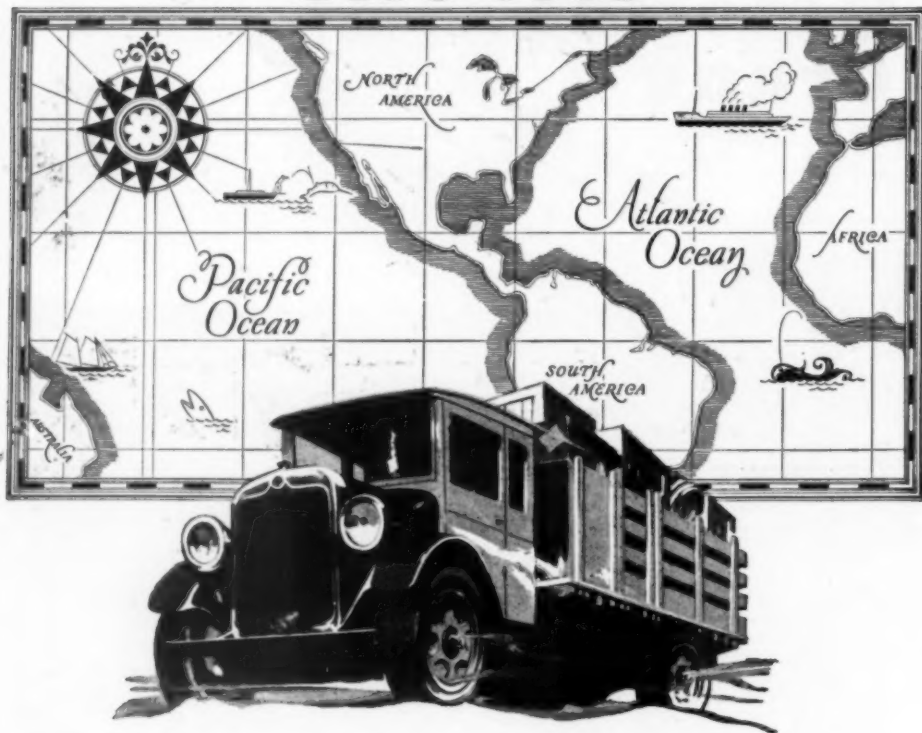
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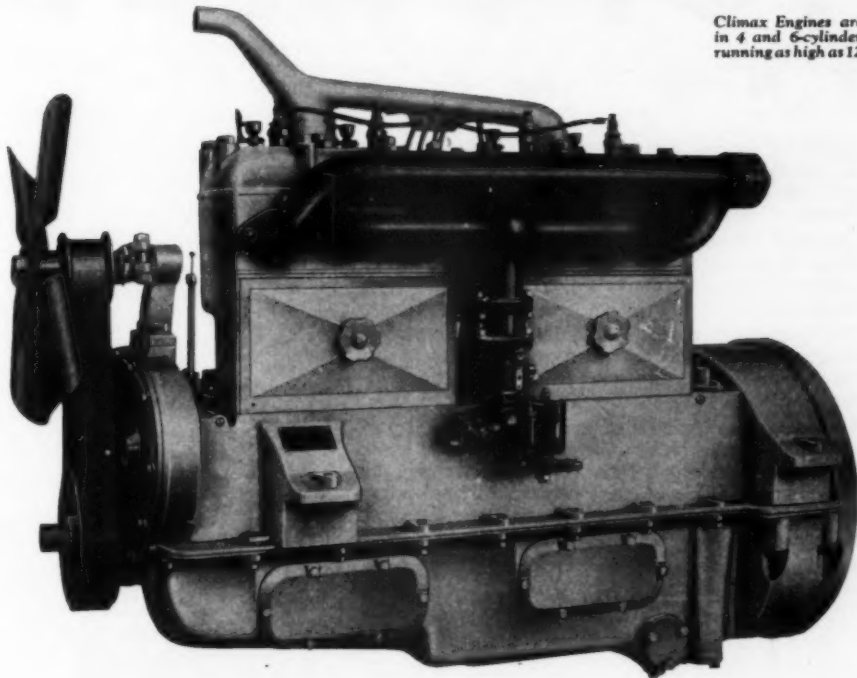
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No. 6

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Protection of Concrete Against Alkali

By E. C. E. LORD

Petrographer, U. S. Bureau of Public Roads

THE investigations carried on for some years by the United States Bureau of Public Roads to determine the degree of protection against alkali attack afforded by treatment of concrete with tar and paraffin have been continued, and additional information has been gained regarding the physical properties of the preservatives and their behavior when applied to various types of concrete.

The earlier tests were carried out on port-

each mix were immersed for 24 hours in a 20 per cent paraffin-kerosene solution at about 80 degrees Fahrenheit and given 4 coats of this solution after the cylinders had dried out for one week. Two batches from each mix were left untreated, one to be stored in alkali solution and the other in tar water.

These earlier samples were weighed before and after treatment and stored, four each, in porcelain-lined, covered cans containing 6,000 cubic centimeters of a 3 per cent sodium-

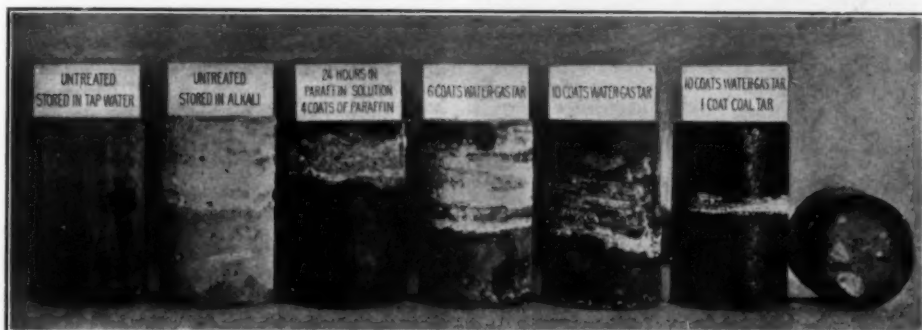


FIGURE 1. SURFACE CONDITION OF 1:2:4 CONCRETE CYLINDERS WITH VARIOUS TREATMENTS AFTER THREE YEARS IN ALKALI SOLUTION AND TAP WATER

land cement concrete cylinders, 4 x 6 inches, made of Potomac River sand and gravel graded in the proportions of 1:1½:3, 1:2:4, and 1:3:6, and cured for 28 days in damp sand and about four weeks in dry air. These cylinders were treated with 5 and 10 coats of water-gas tar alone and with 10 coats of water-gas tar and a seal coat of heavy coal tar cut back with solvent naphtha to a working consistency. In later tests a lighter tar requiring no dilution has been used in place of this heavy tar.

In addition to the tar treatment samples of

magnesium sulphate solution. For the first two years the solution was frequently renewed, and the specimens removed at weekly, monthly, and trimonthly periods and allowed to dry out for 48 hours before returning to the alkali bath. Following the 2-year period the samples were allowed to remain undisturbed in the alkali solution for the final twelve months, but with the cans partly uncovered. During this time a considerable loss by evaporation took place, resulting in an appreciable concentration of the solution and crystallization of sulphate salts on the surfaces of the cylinders.

At the end of each year all samples were removed from the solution, weighed, and allowed to dry out for 10 days in the laboratory, when approximately constant weight was obtained. The difference between this weight and that immediately after removal from the bath indicated capillary or absorbed moisture, while the original dry weight deducted from that after immersion and drying represented essentially the secondary salts formed during the test period. These salts, together with the lime dissolved from the test specimens, as well

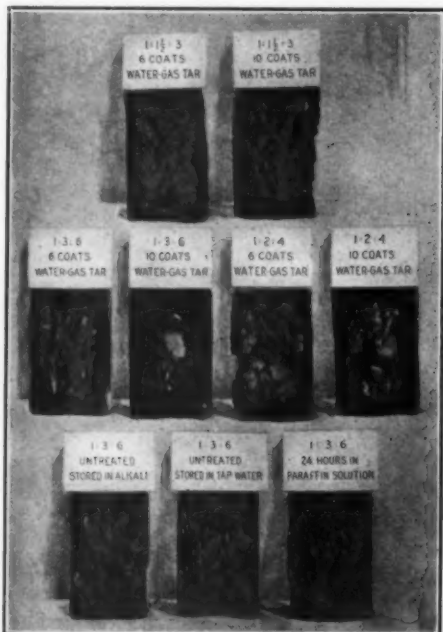


FIGURE 2. CONDITION OF THE INTERIOR OF CONCRETE SPECIMENS AFTER THREE YEARS IN ALKALI SOLUTION AND TAP WATER

as insoluble residues found in the cans, served as a measure of the intensity of attack of alkali on the specimens.

During the early stages of the investigation it was noted that the lime dissolved from the untreated specimens gradually decreased in quantity until after a period of about three months it was entirely removed from solution. This loss in lime was accompanied by an equivalent loss of magnesia and by the formation of lime and magnesia carbonates and calcic sulpo-aluminate. The latter salt was found only as a precipitate in the cans and not in the concrete itself, indicating that the failure of concrete under the present test conditions can not be attributed to this salt.

Destructive Agencies

The destructive agencies have been found to consist chiefly of magnesium hydrate and gypsum, which are formed immediately when free lime developed in the cement on setting, is brought in contact with solutions containing magnesium sulphate. This was especially noticeable in imperfectly seasoned concrete, where colloidal magnesium hydrate and gypsum crystals forming in the body of the concrete caused sufficient volume change to rupture the specimens within three months. In well-seasoned concrete, on the other hand, the formation of calcium carbonate during the curing period increased the density of the mass, thereby retarding the entrance of alkali and rendering the concrete very resistant to alkali attack.

Upon completion of the 3-year period of exposure the cylinders were photographed to show the surface condition of the concrete. No evidence of serious injury by alkali was observed on any of the specimens except those of 1:3:6 mix, and the poor fabrication was seemingly responsible for the injury of these specimens.

Results of Tests

These tests are essentially of a chemical nature and serve to indicate, through gain in weight by accumulation of secondary salts, and absorbed moisture, and loss of soluble material, the effect of alkali attack, and the degree of protection offered by the various treatments.

In the results of the tests covering a period of three years the amount of protectives taken up increases with the leanness of the mix and is proportionate to the number of coats applied. Considering the quantitative effect of alkali attack, the total percentage of gain and loss increases with the leanness of the mix and decreases with the quantity of protectives applied, except in one case where an excessive gain in weight resulted from partial failure of two of the cylinders.

There was a very small percentage of dissolved material as compared with the large increase in secondary salts, chiefly carbonates of lime and magnesia, which exceed $4\frac{1}{2}$ per cent in untreated 1:3:6 specimens stored in alkali. During the third year, when the samples were partly immersed in the alkali solution, appreciably lower values for absorbed moisture were obtained than in previous years, while the average quantity of secondary salts remained about constant.

Batches receiving a maximum quantity of both tar and paraffin are about equally protected, but where the seal coat was omitted there was a decrease in protection of from $\frac{1}{4}$



FIG. 3. SLABS PAINTED WITH FOUR COATS OF WATER-GAS TAR AND ONE COAT OF COAL TAR AFTER ONE YEAR IN THE OPEN

The marked penetration of the seal coat in the leaner mixes is shown by the faded tones

to $\frac{2}{3}$ in the case of tar-treated samples and about $\frac{2}{5}$ for those treated with paraffin.

The effect of alkali attack on samples immersed in paraffin solution appeared to be mainly superficial. This is further substantiated by a relatively high loss by abrasion and chemical action (0.07 per cent) and low percentage of absorbed moisture (1.12 per cent).

Comparing the chemical effect of alkali attack on the untreated samples after three years' exposure with that of cylinders receiving the maximum protective treatment the results of the tests indicate for the latter at least a four-fold protection.

An examination of the test specimens after breaking indicates a very unequal grading of the coarse aggregate in the tar-treated samples resulting in high porosity and frequently in honeycomb structure. This imperfect grading is especially noticeable in the leaner mixes where partial failure of the test pieces occurred during the third year of exposure to alkali attack.

No evidence of alkali attack is noticeable in any of the specimens except possibly in the 1:3:6 mix showing a disproportionate amount of coarse aggregate. The depth of tar penetration is dependent upon the porosity of the concrete and varies from about $\frac{1}{4}$ -inch in the denser mixes to almost complete saturation in the 1:3:6 mixes receiving 10 coats of tar.

Waterproofing Values of Water-gas Tar

Preliminary tests were made with various types of water-gas and coal tars in regard to their penetration and waterproofing values in order to qualify the material found best suitable for further work, and tentative specifications were drawn up. It seemed desirable to determine the penetrating and waterproofing properties of water-gas tar when applied to cement mortars and concrete of varying con-

sistencies both by surface application and immersion. The tests were made on 1:1½ and 1:2 mortar and 1:1½:3, 1:2:3, and 1:2:4 concrete cylinders of both wet and dry consistency, with water-gas and coal tar conforming to provisional specifications.



FIG. 4. APPLICATION OF TAR TO PIER OF ARKANSAS RIVER BRIDGE, COWLEY COUNTY, KANSAS

The immersion treatment was carried out on cylinders, four to a batch, which, after weighing, were submerged successively in water-gas tar, the first for $\frac{1}{2}$ hour, the second for 1 hour, the third for $1\frac{1}{2}$ hours, and the fourth for 2 hours. After each treatment the samples were allowed to dry out thoroughly and the depth of tar penetration and time required for the drying of each specimen recorded. Gain in weight after each treatment indicated the quantity of tar absorbed. The same procedure was followed in the surface treatment, except that the samples were painted with 1, 2, 3 and 4 coats of tar.

The results of the tests indicate clearly that dry-mixed mortar and concrete are less tar absorbent than similar mixes of wet consistency and that the rate of penetration as indicated by the time of drying, is slower in the dry mixes than in the wet. This may be attributed to less complete hydration in the former with correspondingly lower colloidal content than where a normal quantity of mixing water was used. The tar absorbed by concrete increases in general with the leanness of the mix, as previously noted, evidently due to increased porosity. Comparing the quantity of tar absorbed, after $\frac{1}{2}$ hour immersion by concrete of all mixes with samples of similar mixes receiving four coats of water-gas tar, the tests indicate that appreciably more tar has been taken up by the immersed specimens.

In the mortar specimens the dry mixes are about equally absorbent, but when of wet consistency the richer mixes are the more absorbent.

After receiving the water-gas tar treatment all samples were immersed in water for 10 days and their gain in weight determined. They were then allowed to dry out for 10 days and given one coat of coal tar and again immersed in water and reweighed after 10- and 28-day periods. These results point out that 4 coats of water-gas tar or immersion for any period up to two hours without an additional seal coat of coal tar are insufficient to greatly retard the ingress of water into concrete under the above test conditions. However, with the seal coat of coal tar, the quantity of moisture absorbed after 28 days averages less than $\frac{1}{2}$ per cent in the richer mixes and somewhat over 1 per cent in the leaner mixes.

The results indicate in general that concrete as well as mortar of dry consistency, although less tar absorbent, is fully as moisture resistant as similar mixes of wet consistency. The penetration is about the same for samples immersed for $\frac{1}{2}$ hour and those receiving 4 coats of tar while the water absorption is somewhat less in the painted samples. Con-

crete exposed to the action of alkali solutions should not be leaner than a 1:2:4 mix, and should be protected by at least 4 coats of water-gas tar (equivalent to $\frac{1}{2}$ hour immersion) and one seal coat of heavy coal tar.

Field Tests With Water-gas Tar

Supplementing the laboratory tests, field tests were made to obtain information regarding the quantity of tar absorbed per square yard of surface (covering capacity) when applied under conditions approximating those met with on structures situated above water level. For this purpose concrete slabs, $36 \times 36 \times 4$ inches, were made with portland cement, and Potomac River sand and gravel in the proportion of 1:1 $\frac{1}{2}$:3, 1:2:4, and 1:3:6, and cured in the forms for two and seven days under damp burlap. Some of the slabs were painted immediately after stripping the forms, while others were allowed to dry out for 7, 21, and 83 days before painting. All slabs were given 4 coats of water-gas tar at intervals of about one hour, and one coat of coal tar, in some cases immediately following the final coat of water-gas tar and in others 60 days thereafter.

The results showed that the quantity of tar absorbed increases with the leanness of the mix regardless of the method of curing, and is greatest in the slabs cured for 7 days in air after remaining in the forms either 48 hours or 7 days. Approximately equal amounts of tar were absorbed by samples painted immediately after removal of the forms and after curing for 21 and 83 days in air. Estimated on a per-cent-by-weight basis it was found that these samples (tar absorbed taken as 100 per cent) had taken up on an average 34.6 per cent less water-gas tar and 20.8 per cent less coal tar than those cured for 7 days in air.

A very appreciable increase was noticed in coal tar absorption where the slabs were allowed to dry out for 60 days after the water-gas tar treatment. The maximum absorption for coal tar was at the rate of about $\frac{1}{16}$ gallon per square yard for one coat on 1:2:4 concrete, while that for water-gas tar was about $\frac{1}{8}$ gallon for 4 coats on 1:3:6 concrete cured for 7 days in the forms and 7 days in air.

While the treatment described is still in an experimental stage, numerous structures exposed to the action of alkali and sea water have been successfully treated, both above and below the water line, and their results noted.

Conclusions

The following conclusions have been drawn from the results of the tests both in the field and laboratory:

1. That water-gas tar of the proper quality



FIGURE 5. TREATED CONCRETE PILES, SANTA MARIA RIVER BRIDGE NEAR SANTA MARIA, CALIF.

is readily absorbed by cement mortar and concrete, the rate of absorption varying with the manner of curing, age and density of the mix. Concrete of a 1:3:6 mix cured, respectively, 48 hours and 7 days under moist conditions in the forms followed by 7 days' exposure to dry air, was found to be the most absorptive, while a 1:1½:3 mix, cured 7 days in forms and 83 days in air, was the least absorptive.

2. That the absorption of coal tar by concrete is similar to that of water-gas tar ex-

cept that the quantity absorbed increases with the time of exposure after treatment with water-gas tar.

3. That a treatment consisting of 4 coats of water-gas tar applied at the rate of about ¼ gallon per square yard of surface, followed by one coat of coal tar appears to afford adequate protection against alkali attack, provided the concrete is of good quality, has been properly fabricated and not leaner than a 1:2:4 mix.

Fourth Edition of Highway Engineers Handbook

THIS serviceable handbook by Wilson G. Harger, C. E., and Edmund A. Bonney, formerly Supervising Engineer, New York State Department of Highways, is now in its fourth edition. The handbook has not been revised since 1919. The present revision brings it up to date and makes it a most convenient volume for office men and, bound as two volumes, for field men. The text has been entirely rewritten, construction and reconstruction methods and costs are given in detail, and a number of additional convenient design tables have been introduced. A convenient list of most used data appears both on the inside front and back covers and the index is comprehensive.

All phases of highway construction from general administrative and economic data through location, grades and alignment, section, pavement width, right of way and clearing, drainage, culverts and bridges, ditches, underdrains and storm sewers, earth, sand clay and gravel roads, macadam and rigid pavement, maintenance, reconstruction, elimination of grade crossings, minor points of design, materials, detailed data for survey design and construction, office practice and cost data, are in-

cluded. Following the major portion of the book is a section devoted to general tables and formulae and an appendix on first aid. The price of this book of 1721 pages, replete with diagrams, illustrations, charts and tables, is \$6.00. This book is published by the McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York.

A Directory of the Sheet Steel Industry

THE Sheet Steel Trade Extension Committee, Oliver Building, Pittsburgh, Pa., has recently issued a 432-page book which will be of interest to all engaged in the manufacture, fabrication or application of sheet steel or sheet steel products. In the 432 pages of data are included the names of all sheet steel manufacturers and 3,000 sheet steel fabricators throughout America. There is also a classified list of more than 5,000 sheet steel products with the names and addresses of the fabricators. As an introduction there is a history of the development of iron and steel from the earliest reduction of iron down to the present high development of the various forms of commercial steels. Copies may be secured postpaid at \$3.00 each from the Sheet Steel Trade Extension Committee.

Materials for Bridge Construction

By DR. RALPH MODJESKI
Consulting Bridge Engineer, New York City

THERE is no doubt as to the efficiency and usefulness of reinforced concrete for certain types of construction but the tendency now is to use it for every conceivable purpose. We all know the history of the short lived reinforced concrete ships, as one of the examples of the misplaced confidence in that combination of materials. We all have heard or seen accidents where reinforced concrete structures, partially or entirely completed, collapsed, causing not only loss of time and property but in some cases loss of life. It is safe to say that had these structures been built of steel, these accidents could not have happened.

The type of reinforced concrete structure which appeals to me most is one in which the steel frame is sufficient to carry the loads, the concrete in which it is imbedded providing only lateral stiffness and fire protection but with no reliance placed on it to carry main stresses. Such is the bridge over the Maumee River in Toledo, Ohio, at Cherry Street. Such are also the concrete floor slabs of the Delaware River Bridge at Philadelphia.

One great advantage in steel is that at the time the material goes into the structure it has been or may be thoroughly tested—whereas cement tests take several weeks or even months to make and the structure is often completed and doing its duty before the results of the test are known. The concrete, even after the cement and aggregates have been tested and inspected, requires careful watching and inspection during mixing and placing to see that correct proportions of cement, aggregates and water are used; that they are thoroughly mixed; that the resulting concrete is carefully placed in contact with the forms and with the reinforcing steel; and that it is protected and kept damp until set. All this is done in the field by men whose vigilance is often outwitted by careless, ignorant or unscrupulous workmen. In a purely steel construction the stress-carrying material comes to the field inspected under laboratory and shop conditions, and little remains to be done beyond the inspector's elementary duty of testing rivets and the tightness of joints. The steel structure as soon as completed can be relied upon absolutely to carry the loads for which it was designed. A concrete structure must not be loaded to its full capacity until it has thoroughly set, which usually takes several weeks.

There have been many instances of concrete disintegrating; to prevent it, the exposed surfaces should be protected in order to keep moisture from penetrating its pores. That is one reason, aside from appearance, which led the Board of Engineers of the Delaware River Bridge to use a granite facing on all concrete masonry. It is believed that concrete thus protected is durable and will be satisfactory. This form of construction, however, with the present high cost of cut stone, is expensive and can be used only in more or less monumental work. The surface of concrete, even though carefully treated, after a certain time is almost sure to present unsightly stains, if not cracks and abrasions.

Concrete Indispensable

But the modern engineer could not very well do without concrete. It has become an indispensable material for mass masonry and certain reinforced elements of structures. But it should be used judiciously and with proper safeguards to insure its permanency and safety. After the cement has been obtained from a reputable firm and even after satisfactory tests have been secured, the concrete is apt to play unexpected tricks. For instance, while the South main pier of the Quebec Bridge was being built an interesting and very unusual thing happened. The pier was of granite with concrete backing. After the backing of one of the courses was placed, the concrete would not set for a week or more. The work was being done during mildly freezing weather, but all known precautions, such as steam pipes, tarpaulins, etc., were used. The concrete simply would not set. So it was finally decided to remove it and replace it by fresh concrete, which then set in the usual manner. The defective concrete had been removed with pick and shovel and dumped alongside the pier on dry land. Within a few hours it set and became very hard. The cement had been carefully tested and inspected and the same brand successfully used in other portions of the work.

Stress Analysis

Looking at reinforced concrete from the point of view of strict stress analysis, we are confronted by the uncertainty of how to co-ordinate two materials whose coefficient of expansion is nearly but not exactly the same—

whose coefficient of elasticity is different—whose properties to resist tension are totally different. Then, too, the initial shrinkage of concrete which varies with the different cements and the different circumstances of mixing and atmosphere, is not susceptible to strict analysis. It introduces initial stresses in the reinforcing steel which may be tension or compression and which it is impossible to calculate. A reinforced concrete beam carrying bending stresses must rely solely on the reinforcing steel in the tension flange while concrete participates in carrying stresses in the compression flange; hence another circumstance tending to complicate stress calculations.

Time of Construction

It is to the interest of both the engineer and his client to complete a structure in the shortest time possible. Let us consider bridges, for instance. The advantages of early completion are obvious. A steel bridge may be erected during winter in the most severe cold weather. Not so with concrete, which should not be laid in freezing weather without elaborate and expensive precautions. This does not apply to certain Southern states where winters are without intense frost. But even there, the steel superstructure can be erected in a very much shorter time than it would take to build forms, place the reinforcing rods, pour the concrete, allow it to set and finally remove the forms.

The proposed bridges at Tacony over the Delaware River near Philadelphia, as well as the one at Louisville over the Ohio River, will be of steel. The first one, aside from its long navigation span and its bascule span, will be composed of short steel lattice girders, and the second one of a series of steel arches. In both these bridges reinforced concrete arches would have been possible but the engineers chose steel because of:

1st: Possibility of erecting the superstructure by cantilever method or with very little falsework—when concrete arches would require heavy centering and be in danger from floods.

2nd: Much more rapid erection of the steel spans.

3rd: Continuous work during winter.

4th: Other reasons spoken of in this paper, such as certainty of calculations, etc.

Life of Materials

As yet we do not know how long the reinforced concrete structures already built will last. We know that steel will last indefinitely if properly designed, cared for and protected. The Menai Bridge in England, an eyebar chain suspension bridge, lasted over one hundred years. There are link suspension bridges in China which no doubt have lasted for centuries.

There is no doubt as to the value of good dense concrete as a lasting protection for steel against corrosion. This has been fully demonstrated and is one of its most valuable properties. There is a grave doubt whether the

steel in tension flanges of reinforced concrete beams will not be exposed to oxidation through the cracks in its shell of concrete, since, as remarked before, the concrete, being practically inelastic, is bound to crack under tension.

Alloy Steels

We are now in the era of steel alloys for construction use. Chrome steel was used

in the Eads Bridge at St. Louis. Later nickel and silicon steel were introduced and widely used. Mayari Steel, a natural Cuban ore, containing both chrome and nickel, was used in the Harahan Bridge at Memphis. Copper bearing steel is now being talked of as a suitable material for structural purposes. It is said to be less subject to corrosion than ordinary steel. We may expect still greater progress in the alloy steels and their application to engineering structures. The discovery of an absolutely rustless and not too expensive alloy which would still retain its physical properties of strength and resilience now obtained in steel is quite probable. When this occurs we shall have an absolutely perfect material of construction requiring no painting or any other protection from the elements and at the same time being absolutely reliable and durable. Even now with the steel subject to rust if not properly taken care of, we do not often hear of steel structures being replaced because of deterioration. Most of the replacements are necessary because of increase in loading or because of

The purpose of this paper is to discuss the relative merits of steel and reinforced concrete construction. In his excellent paper presented before the American Institute of Steel Construction in October, 1926, entitled "Steel for Strength and Security," Professor Geo. F. Swain treats the subject so exhaustively that it is difficult to add to it. May I say here that I agree with most of the ideas expressed by Prof. Swain?

Dr. Ralph Modjeski.

other conditions making alterations necessary. And it may be added here that alterations in structural steel are much more easily accomplished than in reinforced concrete.

Summary

Steel can be thoroughly tested before it goes into the structure. It can therefore be relied upon to carry the loads assigned to it better than reinforced concrete, which requires not only tests of cement and aggregates over long periods of time, but also a constant and strict

supervision during construction.

The stresses in steel can be calculated with much more precision than in reinforced concrete.

The time required for steel construction is in most cases shorter than for concrete.

Steel construction may be carried on during freezing weather with perfect safety.

It is absolutely permanent when kept protected from moisture.

—**ACKNOWLEDGMENT.**—From a paper presented before the American Institute for Steel Construction, October, 1927.

The Holland Tunnel Opened to Traffic

The Longest Vehicular Tunnel in the World Accommodates 46,000 Vehicles Daily

THE Holland Tunnel was formally opened November 12, when the New York State Bridge and Tunnel Commission and the New Jersey Interstate Bridge and Tunnel Commission held impressive ceremonies at the entrances of the two tubes. President Coolidge, on board the *Mayflower*, touched a golden key which unfurled the flags at the entrances of the tunnels and marked the official opening of one of the most important engineering projects of the country. The tunnel is 9,250 feet in length and connects the highway systems of New York and New Jersey and will serve to do away with much of the congestion that has existed for many years.

The tunnel, which consists of two tubes—one taking New Jersey-bound traffic, the other taking New York-bound traffic—was constructed by the two state commissions. Clifford Milburn Holland, the first Chief Engineer, and his successor Milton H. Freeman both died while the task was under way, and Ole Singstad, Chief Engineer, carried the work on to completion.

Ground was broken for the first contract on October 12, 1920. Since that time, twenty-two construction and equipment contracts have been let and brought to completion. The tunnel cost \$48,400,000, half of which was met by New York State and half by New Jersey. The latter's share was financed by a bond issue. New York State has paid its entire share out of appropriations from current revenues, the last appropriation having been made this year.

The driving of the tunnels was done by means of shields working under compressed air, which balanced the pressure underneath the bed of the river and held the water out. The maximum pressure required was 47½ pounds per square inch above atmosphere. The tunnel is built of cast iron segments bolted to-

gether, forming a ring of 29 feet 6 inches outside diameter. Salient facts and figures are as follows: length—9,250 feet; distance between portals—8,463 feet; distance between river shafts—3,374 feet; length under river—5,480 feet; number of roadways—two; roadway width—20 feet; headroom—13½ feet; hourly vehicle capacity—3,800; maximum daily capacity—46,000; yearly capacity—15,000,000; maximum upgrade—3.8 per cent; maximum downgrade—4.06 per cent; excavation—500,000 cubic yards.

Aside from the problems of masonry in construction the solution of the ventilating question was one of the biggest things the engineers had to solve. Because of the fact that virtually all the vehicles using the tunnel will be gas-propelled, all carbon monoxide gas had to be eliminated. The system of ventilation adopted involves a transverse instead of a longitudinal movement of air. Eighty-four huge ventilating fans, housed in two buildings on the Manhattan side and two on the Jersey, but only fifty-six of which are used in normal circumstances, supply fresh air to the tunnel at the rate of 3,761,000 cubic feet each minute, completely changing the air in the tunnel 42 times each hour thereby keeping the carbon monoxide down to four parts in 10,000 parts of air. The fan buildings are ten stories high and the vitiated air sucked from the tunnel is expelled from the tenth floor. Blower fans of 200 horsepower draw in fresh air and pump it into the tubes, where it is put into circulation gradually. Dials register the exact condition of the air in the tunnel at all times. Samples of the dead air drawn from the two tubes are submitted to analysis and the results are forwarded to a signal room, where a recording machine counts the parts of carbon monoxide to each 1,000 parts of air. The electric current for driving the ventilating equip-

ment is obtained from both sides of the river. Two independent generating sources on each side with three independent cables leading from each source of supply provide an installation sufficiently assured against breakdown.

Before vehicles enter the tunnel they separate into two lines of traffic. One of these is made up principally of pleasure cars and is known as the fast moving line. The other is known as the slow moving line and is made up of trucks. The maximum speed in the tunnel has been fixed at 20 miles an hour and the minimum speed of the fast line on upgrades has been fixed at 16 miles per hour, and on the slow line at 8 miles per hour.

Along the left hand side of each tube there runs an elevated walk and on this traffic policemen are stationed at various intervals. A telephone and signal light system, with stations at every police post, enable guards to spread information instantly from one end of the tunnel to the other in case of an accident or traffic jam. Emergency fire fighting apparatus has been installed at the police posts, and two combination fire patrol and wrecking cars are kept waiting at the exits of the tubes.

The walls of the tunnel are lined with a vitreous white tile, that is easy to clean and also adds to the brilliant lighting of the tunnel. Electric lights, set in openings near the top of the side walls, on each side of the tunnel, covered with diffusing glass, keep the tunnel as

light as day. The lights are so arranged that they will eliminate all glare and shadows. The floor of the tubes is of a smooth resilient surface of 5-inch granite blocks on a concrete base. The ceiling gives a headway of 13 feet 6 inches, ample room for trucks. The maximum depth of the roadway is 93 feet below mean high water.

Five to eight minutes is consumed by passenger cars in going through the tunnel and from twelve to fifteen minutes by trucks. Tolls are commensurate with ferry charges and will be sufficient to provide for the amortization of the project within a twenty-year period. Toll—fifty cents for private motor cars, motor trucks, according to size, with average of \$1.25.

In coping with the special problems of the Holland Tunnel, engineers were aided by studies of the Blackwell and Rotherhite tunnels in London, the three-tube harbor tunnel in Glasgow and the two tubes under the River Elbe at Hamburg.

For other articles on the construction of the Holland Tunnel see the following issues of *CONTRACTORS AND ENGINEERS MONTHLY*: February, 1922 (bids placed), February, 1923 (comparison of tunnel section with Hudson Tube section), April, 1924 (pictorial story), February, 1925 (two photographs of shields meeting under the river) and February, 1926 (the complete story).

Road Show Hotel Reservations

THE Hotel Committee of the American Road Builders Association has announced that it will function right up to the middle of Road Show week, January 9-13, 1928. Those attending the Road Show instead of wandering about from one hotel to another in search of accommodations, will be assigned to a room immediately through the Housing Bureau. This bureau will be materially helped by early reservations on the part of engineers and contractors for whom a large section of the hotel rooms are being reserved. Address Hotel Committee, American Road Builders Association, 304 Chamber of Commerce Building, Cleveland, Ohio. Room reservations have been so arranged that it is now possible to state definitely that visitors can be accommodated without undue taxing of the city's facilities, according to the Hotel Committee.

Fireproofing Specification Booklet Issued

A STANDARD Fireproofing Specification booklet has just been issued by a committee of engineers working under the auspices of the American Institute of Steel Construction. The book has been compiled to the end that the fireproofing of the steel frames of buildings may be placed upon a more rational basis, and may be

brought into conformity with the latest developments of scientific research.

The Specification is divided into seven sections: purpose and scope; fires; fire hazards; steel; fireproofing materials; tests; and safety factor. The personnel of the committee which formulated the Specification is: H. G. Balcom, Consulting Engineer, New York; Frank Burton, Consulting Engineer, Detroit, Mich.; A. R. Ellis, General Manager, Pittsburgh Testing Laboratories, Pittsburgh, Pa.; S. H. Ingberg, Senior Engineer, U. S. Bureau of Standards, Washington, D. C.; Rudolph P. Miller, Consulting Engineer, New York; and F. E. Turneure, Dean, College of Mechanics and Engineering, University of Wisconsin, Madison, Wis. Copies of the booklet may be obtained from the American Institute of Steel Construction, Inc., 285 Madison Avenue, New York.

New Distributors for Blaw-Knox

THE Security Grating Department of the Blaw-Knox Co., Farmers Bank Building, Pittsburgh, Pa., announces the appointment of the following distributors for Blaw-Knox Security open flooring, Electroforged grating and steps: Worden-Allen Co., Milwaukee, Wis.; Wilson-Weesner-Wilkinson Co., Knoxville, Tenn.; and Jas. A. Hall, 1525 Esperson Building, Houston, Texas.

Standardized Methods Help Iowa Gravel Contractor Who Subs Hauling

Extensive System Organized to Haul Gravel Efficiently and Quickly

FORTY-TWO motor trucks are being used by the M. O. Weaver Construction Co., Iowa Falls, Iowa, one of the foremost gravel hauling concerns in the state, for road construction work. Most of the trucks are owned by sub-contractors, twenty-three of whom are owners of single units, each of which is driven by the owner. The M. O. Weaver Construction Co. owns only three of the trucks. Last season five trucks were owned by C. L. Hixon of Rolfe, Iowa, who hired drivers for them. W. P. Lape owned three trucks, one of which he drove himself. Six trucks were also owned by individuals, who hired drivers to operate them. Most of the trucks are 3-ton units, especially suited for the continuous gruelling work of hauling heavy loads out of deep pits, up and down steep hills and over stretches of new road filled with ruts and soft places, which requires trucks of rugged construction.

In the nine years that M. O. Weaver, head of the company that bears his name, has been engaged in road graveling work, he has graveled more than 500 miles of road which traverse twenty-two counties in Iowa and one county in Minnesota. During the first two years in this work, Mr. Weaver used horses to haul gravel, then later changed over to speedier and more efficient motor trucks. He purchased a



INTERNATIONAL 3-TON TRUCK AT STEEL OVER-HEAD LOADING HOPPER

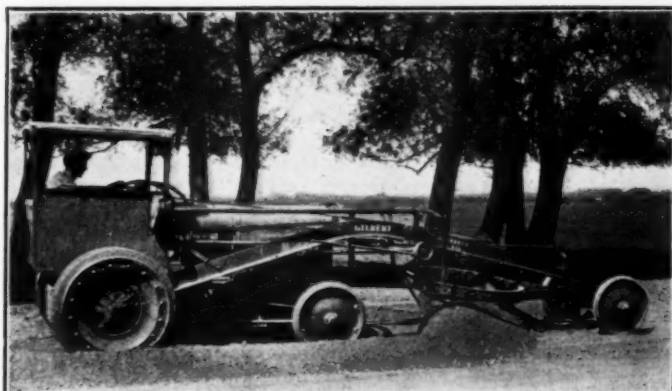
3-ton International unit and hired another, four years ago. Soon after, he decided to standardize on this make of trucks and as his business grew and more and more trucks were required, he stipulated in his contracts that Internationals be used.

When the M. O. Weaver Construction Co. is the successful bidder on a graveling project, it in turn lets the hauling at a contract price of so much per cubic yard per mile, which usually



**M. O. WEAVER,
HEAD OF THE WEAVER
CONSTRUCTION CO.,
IOWA FALLS,
IOWA,
WITH FIFTEEN
OF HIS FLEET
OF
FORTY-TWO
INTERNATIONAL
TRUCKS**

GILBERT
GRADER WITH
McCORMICK-DEERING
TRACTOR
USED TO
SPREAD
GRAVEL ON
ROADS
BY THE
M. O. WEAVER
CONSTRUCTION
CO.



is from 12 to 14 cents. The same motor truck operators usually go from project to project. However, if there is need for another operator, the applicant, in order to qualify for the work, must either own or purchase one of these trucks. In purchasing the truck, moreover, he must have enough money to make the first payment thereon; the deferred payments, then, as well as operating expenses, are deducted from the truck earnings.

The motor trucks are divided into fleets according to the number of gravel pits worked. The men who operate the trucks and the men who work in and around the pits live in camps nearby. In many cases the men are accompanied by their families and live in tents or portable houses. A kitchen is maintained at each camp for those men who do not live with their families, and food is served at 40 cents a meal or \$7.50 a week. Last season there were two major camps. Each camp is in charge of a foreman. A mechanic, a man in charge of fuel and oil disbursements, another at the loading hopper, teamsters and a cook are also employed at each camp.

The motor trucks are loaded from overhead hoppers. Teams with scrapers are used to bring gravel to a belt conveyor which raises the gravel to the hopper. This conveyor is operated by a tractor. The gravel is screened and the stones contained therein are passed through a rock crusher and then elevated into the hopper by a bucket elevator. Since it takes only a fraction of a minute to load each truck and scarcely a minute to unload it, the trucks are busy almost continuously during the working hours, and when the weather is favorable they are in operation for as long as fourteen to fifteen hours each day, for the more they haul the more money they make for the men.

On a check made of work done on the highway between Waterloo and Raymond an aver-

age of four yards of gravel was dumped on the road every three minutes. On another job near Humboldt, the 3-ton trucks were making a seven mile round trip with three and a half miles of load haul in thirty minutes, which included time for loading and unloading. The 3-ton trucks were making another haul of eight miles, or sixteen miles the round trip, to and from the Humboldt pit to Thor in from forty-five to fifty minutes including time for loading and unloading. Mr. Weaver estimates that his company puts an average of 2,000 yards of gravel on the roads every day the sun shines and that each truck travels an average of 200 miles a day.

Disbursements of gasoline, oil and grease, supplies of which are maintained at each camp, are recorded on special tickets and are charged to each truck account. Each driver takes care of his truck and makes minor repairs with the assistance and under the direction of the camp mechanic. Major repairs and the annual overhauling for each truck are done at the nearest International Harvester service stations. Owing to the nature of the work, the trucks are out of doors most of the time. Considering the hard usage that the trucks are continually being put to, the need for repair service has been surprisingly small, this being possible by correct maintenance practices. It is part of the duties of the camp foreman and mechanic to check up on the men in the maintenance work on their trucks.

Records are carefully maintained of all operations and costs. The foreman of each camp makes out a daily report which is sent in to the main office at Iowa Falls. Records of gravel hauled by the various trucks are also sent in to this office on special check sheets by inspectors employed by counties at the places where gravel is delivered. A special account is kept at the Iowa Falls office on each truck. The

ledger sheet on which this account is kept has posted on its debit side all charges sent in by the foreman such as those for oil, grease, fuel, repairs, etc., and also any advances or truck payments made from the main office. On the credit side are entered the number of loads hauled each day, the total quantities thereof as reported by the county engineers and the amount of money to be paid based on the contract price per cubic yard per mile. Periodically the account is balanced and a carbon sheet sent to each driver.

In order to save labor and to speed the work

of distributing the gravel after it is dumped on the road, the M. O. Weaver Construction Co. makes use of a McCormick-Deering tractor equipped with a Gilbert road grader.

Mr. Weaver says that without automotive equipment it would have been impossible for him to expand his gravel hauling operations as extensively as he has done the past several years. To speed the work of building the many miles of improved highways now being constructed and about to be contracted for in Iowa, he says that large fleets of motor trucks are absolutely essential.

Quantity—Quality—Price

A Plea for Rescuing the Construction Industry from the Present Widespread Condition of Guessing and Cutthroat Competition

QUANTITY—Quality—Price is the basis of commerce and of industry. Men toil, delve, fight and sell quantity and quality for a price. The adjustments between quantity and quality on the one hand and price on the other have been going on since the days of Ipus, who was the first contractor.

None of the many marvelous inventions of men down through time has been perfect, and so too in industrial and economic relationships, no perfect system has been worked out. While progress constantly forges toward apparently more perfect schemes, we still have many relationships which are startlingly illogical even as we see them. Let us look to the practice of competitive bidding which has existed since the day when Ipus had a competitor, largely on a lump sum basis.

The essence of fact behind a modern transaction in placing a construction contract on a lump sum basis is that a party commonly called the owner employs either his own or others' services to execute what is commonly called a set of plans and specifications. Through years of experience it has become possible that this set of plans and specifications will be so complete and exact that from them trained persons may compute the labor costs and the material costs and by adding to these certain other items such as overhead costs and profits arrive at a contract price to deliver the building broom clean.

However, the plans and specifications are not always perfect, and contractors individually are so tied down in their own interests in maintaining proper relations with architects that they cannot use the proper leverage in most cases to have them made perfect—the trained men who are the estimators are not always well trained or perfect and sometimes operate in great haste, thus increasing their likelihood of not doing their best.

Therefore, we have today through this country, jobs everywhere that are being bid upon by anywhere from two to twenty contractors, and regardless of the fact that no matter which one gets the job, it will take just so much brick, so much mortar, and so much concrete,

and you will find that the several bidders on any one job have not except in rare instances arrived at the same quantities to bid upon. The several bidders are bidding on the individual quantities they have set up each for himself, and in the knowledge that all cannot be right.

It is not strange that in contracting for the erection of a structure which exists only on paper, there should be a holdover from the old conditions where the shrewdest guesser came out best. Neither is it strange that even today there is the feeling among contractors that "my way of estimating" and "my estimating department" is more accurate than the other fellow's. Nevertheless, that feeling is the ad-

The effect of taking a chance on quantity is the taking a greater chance on price. The effect of taking a greater chance on price is price reduction, or, in other words, is the basis of cutthroat competition where and as it exists among contractors.

mission that accuracy is not prevalent.

For instance, if I am bidding on a 10,000 unit quantity which I feel sure is the right quantity, and know that my competitors are bidding on the same quantity, I shall know that the unit price which I set plus the overhead and profit which I set will be what will determine whether I or someone else gets the job. If I know my unit cost is \$1.00, my bid will be somewhere over \$10,000. I shall feel sure all other bids will be somewhere in the neighborhood of mine.

But if I arrive at the quantity 10,000 units and am not quite sure of it and am reasonably sure that all my competitors have figured different quantities, I cannot take my unit cost of \$1.00 and apply with profit and other items and be sure that every other bid is going to be within reasonable distance of mine. The fact is, I can feel pretty sure that some poor fellow is going to figure 9,000 units, and then if his unit price is about the same as mine, his bid is going to be \$9,000, plus his added profit and overhead provided he knows there is such a thing as overhead.

This is the plight of the contractor today who is in active competition. He has to regard the other fellow's probable gamble on quantity and meet it against his best judgment or lose. Of course, contractors will whenever possible bring other factors to bear, but all too often the only chance to win a contract is on price.

At first this misfortune of the contractor might be thought of as being a boon condition for the owner who will reap the benefit of getting something done for nothing. It is not so, because it is against the principle of self

preservation for anyone to put in quantity and quality at a loss. The owner who desires, expects or employs an architect on the assumption of trying to enforce getting more out of a contractor than the contractor is paid for fairly is his worst enemy, and seldom profits unless he is shrewd in unloading his building before it has to stand the tests of time.

It might be thought that the architect has no direct interest in all this. He has, however, a very direct interest, because when contractors guess on quantities rather than survey them, a premium is set on incomplete and sketchy plans and specifications. You can guess from them almost as well as from really good ones. But given a condition where there is careful checking, the competent architect comes into his own and the incompetent is shown up. An orderly scientific procedure in any industry or affecting any profession or business is directly to the advantage of the business or profession in question.

When quantity is an established fact, then and then only can quality be effectively substituted for price as a basis for bidding. There is no question in the reasonable mind that quantity should be emphasized over price. There is no one connected with the construction industry who is worthy who will not wish for this substitution as promptly as possible. But so long as quantity is gambled with, the substitution of quality for price cannot be made in the wide open field.

ACKNOWLEDGMENT.—From an address by E. J. Bruner, Editor of *The American Contractor*, delivered before the Second Annual Meeting of the American Institute of Quantity Surveyors, June 8, 1927, at Washington, D. C.

Standards for Electric Welding Apparatus

STANDARDS for electric arc and resistance welding apparatus have been submitted to the American Engineering Standards Committee as a basis for national standards on these subjects by the American Institute of Electrical Engineers. It is characteristic of such a rapidly developing industry as electric welding that a certain degree of standardization is necessary as a means of further extension.

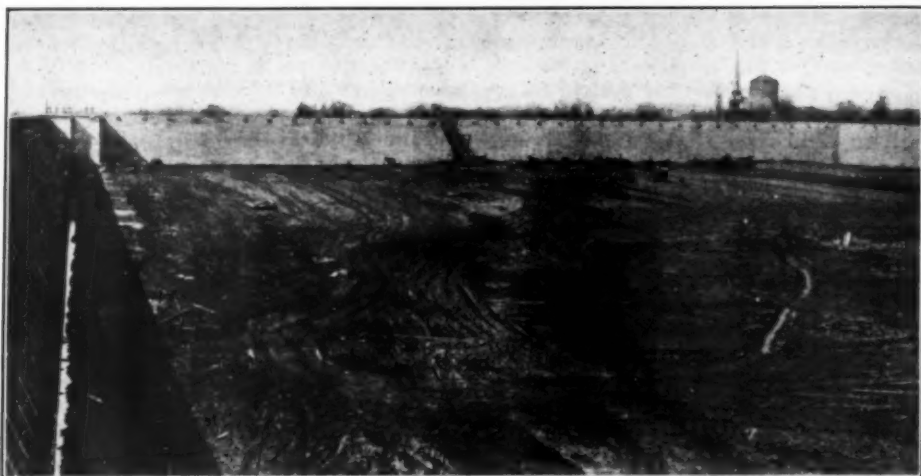
As an example of the rapid growth of electric resistance welding, a single plant may be cited in which more than two hundred different automotive parts now undergo welding at some point in their production cycle. More than one thousand men are there engaged in spot and butt welding alone and nearly three and a half million spot welds are made every day on the different parts. Spot welding machines have now been made practically automatic.

Large buildings have been completely arc welded and this process has also been used for practically all joints in many ships, for tanks, rail joints,

pipes, etc. Resistance welding, however, has proved to be the cheapest method of joining metals, according to the American Engineering Standards Committee.

The standards submitted as a base of national uniformity include nomenclature, methods of making dielectric tests and methods of rating, to be used as a basis of guarantee for the following types of apparatus used in electric and resistance welding operations: direct current generators, motor generator sets, transformers, resistors, and apparatus for electro-percussion welding. Butt, flash, pressure-contact, spot and seam welding are differentiated.

The proposal of the American Institute of Electrical Engineers, which is of importance to several organized industrial groups, including the Association of American Steel Manufacturers and the American Welding Society, has been referred to the Electrical Advisory Committee for study and recommendation to the American Engineering Standards Committee.



THE STACY RESERVOIR BEFORE COLUMN CONSTRUCTION BEGAN

Welding Reinforcement in Concrete Construction

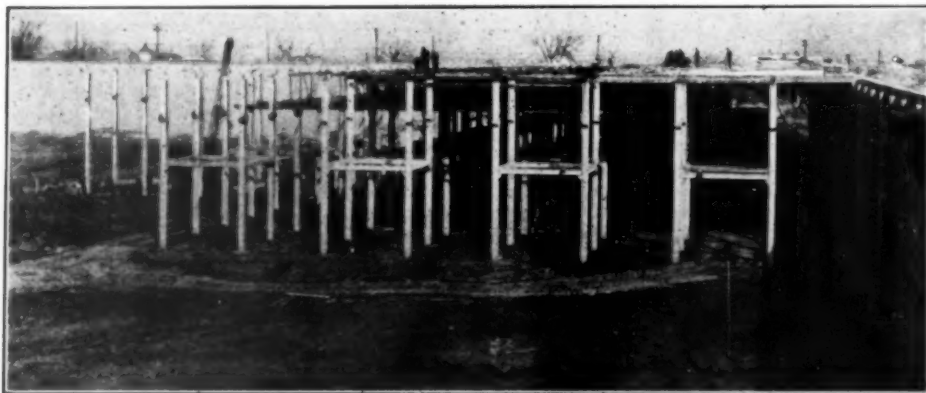
Welding Service Speeds Up Unusual Construction Job and Effects Large Savings

WHEN the city of St. Louis, Mo., was rebuilding the Stacy Park Reservoir, near the city, the possibility of contamination from dirt and gaseous impurities in the atmosphere had to be considered. It was decided to make the reservoir of the covered type.

This is a regulating reservoir with a capacity of 100,000,000 gallons. It is a concrete structure about 600 to 800 feet in length and will carry a depth of about 30 feet of water. The footings are stiff yellow clay with a cut-off wall of sheet piling to shale about 14 feet down. The main walls are buttressed every ten feet. The basin is being covered, the roof being sup-

ported on some 1,700 columns. The concrete has been mixed at a central hauling plant about a mile from the reservoir and hauled to place in trucks. The columns, which are about 34 feet long, have been cast at the mixing plant, transported to place and erected in previously prepared pocket footings. The walls of this reservoir are complete. About three-eighths of the roof has been poured and some floor. It will be completed early in 1928 at a cost of about \$1,200,000. The Frazier-Davis Construction Co. has the contract for this job.

Since there would be practically no side stress on the columns it was decided to use con-



VARIOUS STAGES OF COLUMN CONSTRUCTION BEGINNING WITH THE UNCONNECTED COLUMNS THROUGH TO THE COMPLETED ROOF SECTION

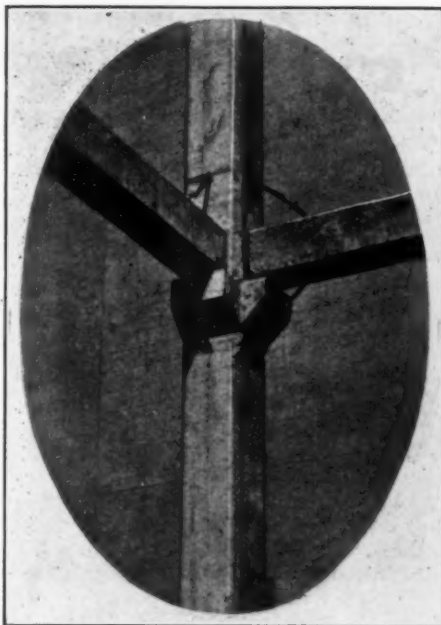
crete cross beams resting on supports cast en bloc with the columns and tied into the columns by steel rods. Various stages of the construction beginning with the unconnected columns and right through to the completed roof section are shown in the second illustration.

The original specifications called for the concrete struts to be tied into the columns by means of reinforcing rods imbedded in the columns and connected by turnbuckles. When work was started, it was soon evident that the turnbuckles would be unsatisfactory. There was trouble locating the struts so that the ends of the tie rods would correspond and enable the construction men to get the turnbuckles started.

Plans were then changed so that the oxy-acetylene welding would do the work of the turnbuckles. The tie rods were cut by the blow pipe and welded with butt joints. This speeded up the job considerably and made a very neat appearance, besides eliminating all the trouble attendant upon the adjustment of the turnbuckles. The struts could be rapidly set in place and the gangs moved on with no further moving of the struts necessary.

Even with this speeding up of the job, however, the engineers were not satisfied. They called in an oxy-acetylene service operator to see whether he could suggest any improvements in their methods. It did not take long before considerable improvement was made.

Butt joints in the tie rods were eliminated and lap joints substituted in order to avoid the necessity for exact fitting. As a general rule, the lap type of joint is not recommended for oxy-acetylene welding, but in view of the low stresses involved, a lap joint of proper proportions was considered satisfactory for this special case. While the appearance was not as neat as before, the resultant saving was amazing. Each welder was able to complete 80 welds a day, where using butt joints, he could complete only 30. This was almost tripling the work done. The rods were simply hammered



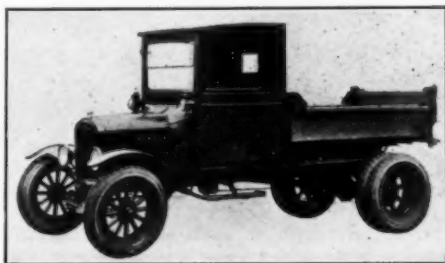
JUNCTION OF COLUMN AND REINFORCING STRUTS
SHOWING LAP WELDED TIE RODS

into place side by side and welded. This eliminated the necessity of cutting to length for the butt joint.

A high test welding rod was used for welding the tie rods. The operators rapidly became more proficient in the handling of this rod as the work progressed toward completion.

NOTE: As a general rule, the use of welding reinforcement rods is not advised, for these are usually of high carbon steel, the strength of which is lowered by the heat of the welding operation. Special heat treatment is necessary to restore the strength and this is not feasible in construction work. The work described here is an exception as high strength was not required in the rods.

ACKNOWLEDGMENT.—Reprinted by permission from a copyrighted article in *Oxy-Acetylene Tips*.



LEE BODY MOUNTED ON FORD TRUCK EQUIPPED
WITH ERIE VAN DUAL WHEELS

Townsend Joins Indiana Truck

THE Indiana Truck Corporation, Marion, Ind., has announced the appointment of Ray F. Townsend as Assistant to the President. For several years Mr. Townsend has been connected with the Federal Motor Truck Co. of Detroit, and prior to that time the Willys-Overland Co. of Toledo. His work in the automotive field during the past ten years has been devoted almost exclusively to sales and sales promotion among branches and distributors. He will have personal contact with the Indiana truck branch distributor organization, assisting in sales and developing sales promotional ideas.

Reductions in Hauling Costs

Economies Realized and Larger and Heavier Loads Handled by Tractor Units

SUBSTANTIAL savings have been made and more work and larger quantities of dirt handled by the Clark & Phillips Construction Co., Cleveland, Ohio, since discontinuing the use of trucks and teams and using crawler tractors with dump trailers exclusively. These new units have reduced hauling costs 19 per cent in comparison with dump trucks and 32 per cent in comparison with teams, on street grading in clay.

A survey recently made by A. C. Nielsen Co., Chicago, Ill., brings out in detail the results and comparative costs of operation and the various advantages of using the new equipment. Two Cletrac "30" crawler tractors were put into service with two Euclid 2¼-yard steel dump trailers.

At the present time, this equipment is working on a 1,500-foot street excavation job for a new subdivision off Chardon Road, near Cleveland. The street width is 50 feet and the cut runs from 2 to 8 feet on one side down to grade on the other. The material is packed clay and the yardage will be about 6,000. The excavated material is used for the fill on both sides of the street with hauls from 50 to 500 feet, the haul being 380 feet at the time of the survey. Because of delays occasioned by wet weather and the length of the haul, one dump truck of the same capacity as the trailers is used to supplement the regular equipment.

The job previously handled by this company

was similar, the haul averaged 400 feet and the total yardage was 8,000. This was completed in 16 actual working days of 9 hours each, representing an average of 500 yards per day. This is considered to be extremely good production as this type of work is usually figured on the basis of 350 yards per day. As high as 700 yards have been handled in 9 hours. The Cletrac units only were used on this job.

The operating methods with these units are simple. The excavated material is loaded by a ¾-yard Model "O" Thew steam shovel, three dippersful to the load. One loaded trailer represents far less than the capacity of the tractor and two trailers can be handled with ease. On this work, it is preferable to use a single trailer, the procedure being to dump the trailer, then back over the pile with the trailer body tilted so as to spread the earth, thus eliminating any need for a bulldozer spreader. On a straight-away dump, two trailers would be advisable.

The labor force on the job consists of operator and engineer on the shovel, two tractor operators, one shovel pit man and one man for leveling and supervising the dump, a total of six men under all normal conditions.

A direct comparison is afforded on the present job between the tractor and truck operation. Part of the haul is over ground kept soft by an underground spring and the truck frequently stalls while passing over this section, often becoming embedded to the axles. The tractors



THEW SHOVEL DELIVERING EXCAVATED MATERIAL TO EUCLID TRAILERS HAULED BY CLETRAC "30" CRAWLER TRACTORS IN STREET EXCAVATION JOB OF THE CLARK AND PHILLIPS CONSTRUCTION CO.

have no difficulty, however, and are used to haul the stalled truck to better ground. This is usually done with both truck and trailer loaded, the tractor readily moving the entire load. Normally the truck makes from two to three trips less per hour than each of the trailers, not figuring the time lost when stalled but only the time required to dump the load and make the trip.

In figuring the operating cost of the tractor, depreciation and average interest at 6 per cent have been figured on the basis of a 2-year life. It is believed that the units will give much longer service, but this concern makes a practice of charging off such equipment in that period.

On the basis of 160 operating days a season, or 8 months of 20 days each, the annual charges per day on the tractor are \$11.59. This includes a 10 per cent repair allowance for general repairs and motor overhauls. Gasoline consumption averages 20 gallons in 9 hours. Engine oil is changed every two weeks and none added. A medium grade oil is used in the engine and in the one-shot lubrication system, and a heavy motor oil is used in the transmission. The total daily operating cost of one of the Cletracs, including labor, is \$22.43.

The trailers are similarly charged off on a 2-year basis, although their all-steel construction, wide 10-inch steel tires, and roller bearing wheels all indicate a longer probable life. The daily cost for one trailer amounts to \$1.75. Shovel costs amount to \$52.41 a day and miscellaneous labor to \$10.80. The total for shovel, two hauling units and labor is \$111.57.

Thus, the 8,000-yard job recently completed on Green Street at an average rate of 500 yards a day was handled at a cost of 22.3 cents per yard, of which the hauling cost was 9.7 cents.

On the present job over wet ground, the same daily yardage is obtained by adding a rented dump truck, increasing the daily cost by \$24.75 and the unit cost to 27.3 cents. This is not a normal cost, however, and is not representative of ordinary conditions of operation on this class of work.

Trucks and teams were formerly used on this job. Not less than three and probably more dump trucks would be required for the present average number of trips made over soft ground by the Cletrac units. Stalled trucks waste shovel time and it is doubtful if it would be economically possible to get steady production with trucks. Figuring three trucks as doing the work of two tractor units, the total daily cost would be \$137.46 and the cost per yard, 27.5 cents, under the conditions of the Green Street job. Not less than 9 teams would be required to handle 500 yards a day on either the present or the Green Street job. At \$1.25 per hour, the total daily cost would be \$164.46, or 32.9 cents per yard.

Over trucks, the daily saving based on the conditions assumed above is \$25.89. The various contingencies affecting actual production from day to day suggest this as a fair basis of annual saving and with 160 operating days the annual saving is \$4,142.40—a net annual return of 61 per cent on the investment in Cletrac tractors and Euclid trailers.

Over teams, the daily saving is \$52.89 and in 160 operating days the saving is \$8,462.40. This is a net annual return of 126 per cent on the investment in tractors and trailers. These savings are most conservative in view of the assured 2-year life of the tractor and trailer equipment. Further, any increase over 160 days of operation would still further increase the annual savings and the net return.

Chain Belt Company Buys Atlas Business

THE Chain Belt Co., 766 Park Street, Milwaukee, Wis., has announced the purchase of the mortar and plaster mixer business of the Atlas Engineering Co., of Milwaukee. This is the second manufacturing business the company has bought within a year, the Stearns Conveyor Co., Cleveland, Ohio, manufacturers of belt conveyors, being taken over about eleven months ago. In buying the mixer business of the Atlas organization, a complete line of mortar and plaster mixers will be added to the Rex line of concrete mixers.

The Chain Belt Co. was organized in 1891 by C. W. Levalley as a chain business. Later, engineering and conveying lines were added, and in 1907 the manufacture of Rex concrete mixers was started. The company operates two plants in addition to the one at Cleveland, one at Eleventh Ave-

nue and Park Street, and the other at West Milwaukee, where the engineering building, concrete mixer building, and malleable iron foundry are located. Branch offices are maintained in sixteen principal cities.

Four other companies are affiliated with Chain Belt: the Federal Malleable Co., Sivyer Steel Casting Co., Interstate Drop Forge Co. of Milwaukee, and the Nugent Steed Casting Co. of Chicago.

Mallory Elected Vice-president of Climax

THE Climax Engineering Co., Clinton, Iowa, has announced the election of E. B. Mallory, formerly a department manager of the Westinghouse Electric & Manufacturing Co., as its Vice-president. Mr. Mallory began his career with the Westinghouse Co. in 1903, having been broadly trained in its various engineering, manufacturing and sales activities.

Bridge Span Collapses During Erection

Heroic Work in Strengthening Slipping Falsework Fails to Save Span

THE second span of the Mississippi River highway bridge at Louisiana, Mo., crashed into the river at 11:30 Tuesday morning, September 6, when the falsework gave way. The coroner's inquest failed to reveal that there had been any carelessness or negligence on the part of the superintendent who had charge of the work of erecting the falsework or of the general superintendent. Evidence at the coroner's hearing was to the effect that the falsework was much stronger than called for in the plans and specifications

in progress when the crash came without a moment's warning.

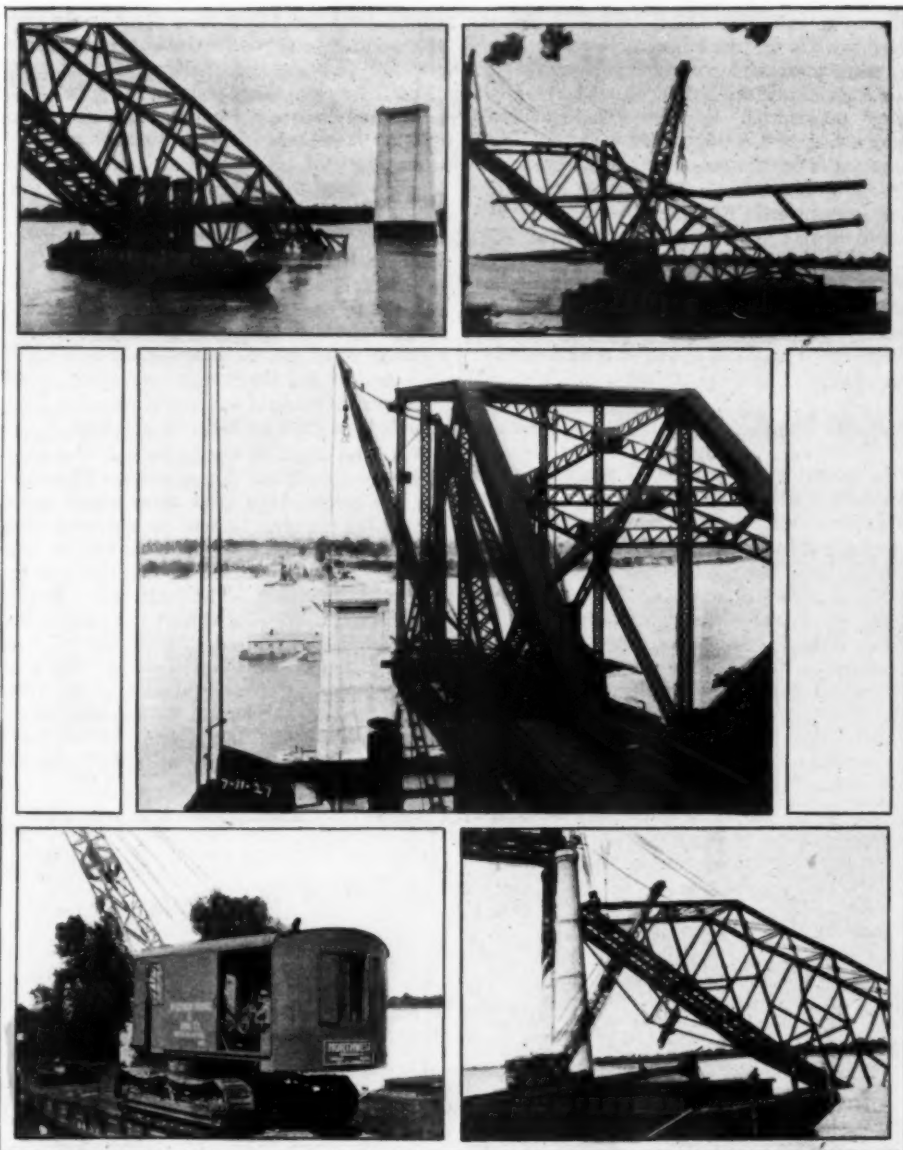
The total length of the overhead span which crashed into the river was 314 feet and 5 $\frac{7}{8}$ inches. Two bents of falsework supported on piling which had been driven into the bed of the river had been erected to support the steel work while the pieces were being assembled to form the span. The distance from Pier 1, upon which the west end of the span rested, to Bent No. 1 was 90.2 feet. From Bent No. 1 to Bent No. 2 was 89.0 feet and from Bent No. 2 to



THE NEW STEEL HIGHWAY BRIDGE AT LOUISIANA, MO., SHOWING SPAN WHICH FELL DURING CONSTRUCTION DUE TO FAILURE OF FALSEWORK

which had been prepared by the engineers in the office of the company. Defective pieces of piling which had at first been placed in the falsework were taken out and replaced with first-class piling before work on the superstructure was begun by the workmen. After it was discovered on the morning of the accident that the falsework was slipping, the superintendent made every effort to protect the structure and prevent injury to the workmen by stopping overhead work on the span and by concentrating their efforts on repairing the falsework. The work of strengthening the falsework was

Pier No. 3, the distance was 135.2 feet. The bottom chord, a piece of steel weighing 16 tons, had just been placed in position forming connection on the lower side between the two piers. The outward or east end of this piece had been bolted to the steel shoe on top of the second pier. When the falsework gave way and the almost completed span fell, the shoe on the top of Pier No. 2 was jerked off. Had the accident happened a few minutes before it did while the men were on the structure, placing the large piece of steel work in position, the loss of life would have been greater. As it



THE LOUISIANA, MO. HIGHWAY BRIDGE ACROSS THE MISSISSIPPI RIVER BEFORE AND AFTER THE WRECKING OF ONE OF THE MAIN SPANS

Center, photograph showing erection of span. Upper left, preparing to land cribs of falsework under the collapsed span before jacking it up. Upper right, piling forms being placed for bent No. 1. Lower left, 75-horsepower Northwest crawler crane and 65-foot boom which was unloaded from car and placed on a barge for use in removing the wrecked span. Lower right, Northwest crane removing steel work of bent No. 1

was one bridge workman was killed and another severely injured.

History of the Structure

The Louisiana, Mo., Bridge is the most northerly of the five new highway bridges be-

ing built across the Mississippi between Missouri and Illinois. The structure consists of four 314-foot spans and one 418-foot span, a total length of 1,674 feet, exclusive of the truss spans and approach. This structure, which will connect the highway system of Missouri and

Illinois at Louisiana, Mo., will link Federal Highway No. 54, which is considered the shortest transcontinental route from New York to Los Angeles and the Southwest. The bridge is being constructed by the Missouri-Illinois Bridge Co., of Louisiana and St. Louis. The contractors in charge of the work are: substructure, Missouri Valley Bridge and Iron Co., Leavenworth, Kans.; superstructure, Wisconsin Bridge and Iron Co., Milwaukee, Wis. L. C. Stark of Louisiana, Mo., is President of the company for which the bridge is being built, and Harrington, Howard and Ash, engineers of Kansas City, Mo., prepared the plans. The estimated cost for construction is \$815,000.

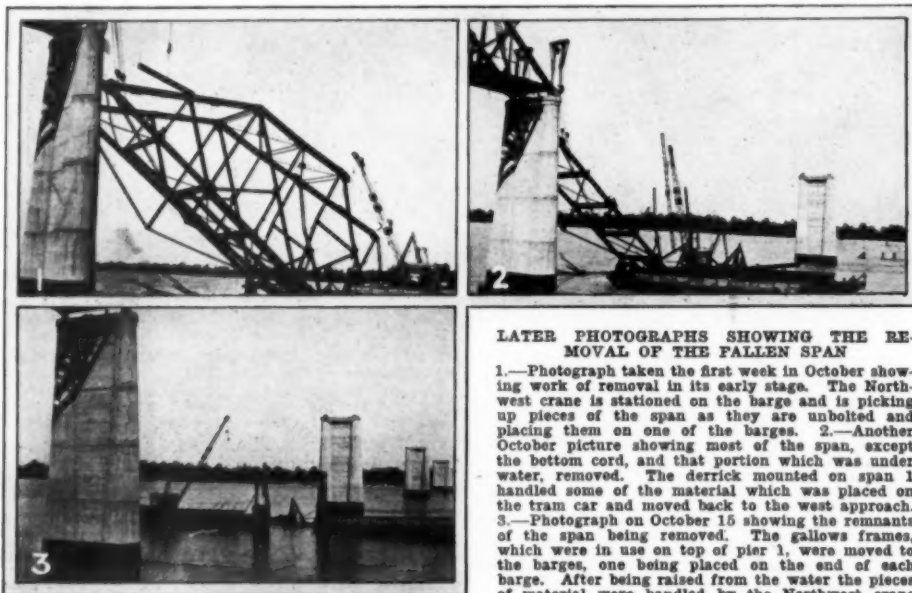
Methods Employed to Remove Wrecked Span

In removing the portion of Span No. 2 of this bridge which fell into the river, two sets of gallows frames were erected on top of Pier 1 and guyed back to the overhead work of span No. 1. Each frame has two sets of block and tackle equipment through which pass wire cables which pull through or are attached to the steel work on the west end of the fallen span which rests against the side of Pier 1. This apparatus has a capacity to support 100 tons. Its purpose is to hold up the end of the span while the workman are employed in removing the material in sections.

Two pieces of heavy timber, one on either

side, were fastened by cable underneath the span at a point directly under the fifth panel point, counting from the end of the span which rests against the pier. This point in the span is approximately 10 feet from the surface of the water. Two bents of heavy timbers weighted with pieces of bridge material were dropped into the river directly under the pieces of timber which had been fastened to the lower chords of the span. Blocks of wood and timber were used to build up the framework bents to a point to permit the use of jacks. The purpose of this was to remove the strain on the bottom chords and upper supporting framework in order that the construction bolts might be removed and the material taken out piece by piece. The steel work was removed from the river without accident of any kind.

Work on removing the fallen span was practically completed on November 1. The illustrations on this page show three stages in the removal of the span. About the last work to be done in the removal of the span was to send a diver below to fasten a cable around the pieces of steel work. The construction derrick which was on the span when it fell was the last material to be removed. The water is about 25 feet deep at the second bent location near Pier 2. A rise of several feet in the river brought down considerable driftwood from the Mississippi and the Salt Rivers, 6 miles above Louisiana, which seriously interfered with the work.



LATER PHOTOGRAPHS SHOWING THE REMOVAL OF THE FALLEN SPAN

1.—Photograph taken the first week in October showing work of removal in its early stage. The Northwest crane is stationed on the barge and is picking up pieces of the span as they are unbolted and placing them on one of the barges. 2.—Another October picture showing most of the span, except the bottom cord, and that portion which was under water, removed. The derrick mounted on span 1 handled some of the material which was placed on the tram car and moved back to the west approach. 3.—Photograph on October 15 showing the remnants of the span being removed. The gallows frames, which were in use on top of pier 1, were moved to the barges, one being placed on the end of each barge. After being raised from the water the pieces of material were handled by the Northwest crane

Advantages of Electric Drive for Building Contractors' Equipment

By R. F. EMERSON

Industrial Engineering Dept., General Electric Co., Schenectady, N. Y.

ELECTRIC current has become the universally accepted medium for house lighting, and also for power in practically all the important industries. The main obstacle in the path of its adoption in the use of building contractors' equipment has gradually disappeared with the general adoption of uniform electric power characteristics.

Formerly, the great objection to electrical service for the building contractor was the great variety of voltages and currents. He might have a job in one city where only direct current was available. His next job might be in a neighboring city or even in a different part of the same city, where alternating current only was available. This condition is now

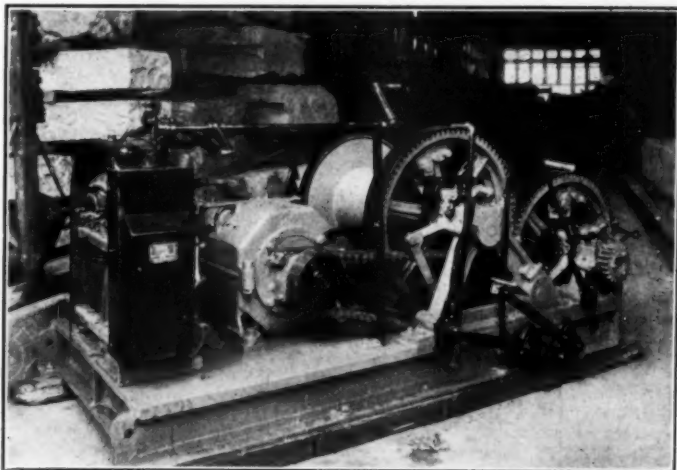
1,000 and 2,500, the census shows that over 96 per cent are served by electric power.

Public utility companies usually have standard published rates for motor service of the temporary character required by building contractors. In cases where the amount of load warrants it, the power company furnishes necessary transformer banks for stepping the voltage down to 220 volts from 2,300 volts or from whatever the distribution voltage happens to be.

As compared with other forms of drive the most noticeable advantages in favor of electric drive are given below:

(A) There are no objectionable exhaust or odors.

A THOMAS
DOUBLE-DRUM HOIST,
ONE OF
SIX ELECTRIC
HOIST JOBS
USED IN
THE
ERECTION
OF THE
THIRTY MILLION
DOLLAR
OFFICE BUILDING
OF THE
NEW YORK
LIFE INSURANCE CO.,
NEW YORK CITY



fast disappearing. Over 90 per cent of the current generated in this country now is alternating current, 60 cycles, and this percentage is constantly increasing.

Notable exceptions to this condition are in the "Loop" district in Chicago and in the Borough of Manhattan, New York, where direct current is still used. Another exception is in the city of Los Angeles, where 50 cycle alternating current is used.

Practically all other cities are supplied with alternating current at 60 cycles. Usually the power is distributed at 2,300 volts. Practically all cities and large towns in this country are now served by central station systems. Even for small towns with populations between

(B) No water is required either for power generation or cooling processes and consequently no trouble will be experienced due to freezing in cold weather, and there is no possibility of having to bother with leaky radiators or water pipes.

(C) Since electric power generation is entirely magnetic the only mechanical wear is in the bearings and there is no consequent steady decrease in efficiency due to the wearing away of pistons, cylinder walls and piston rings.

(D) Electric drive is noted for its compactness. The saving in space by using an electric motor in place of older forms of drive may be realized when it is known that a 20-horsepower, 1,200-r.p.m., squirrel-cage, induction

motor, weighing 500 pounds, requires a foundation space of only about 14 x 10 inches. Its control may be contained in a box suitable for mounting on any flat surface, and will weigh about 100 pounds and have overall dimensions of approximately 22 x 21 x 20 inches. Compare this with space taken by other methods of drive.

(E) Cold weather has no effect on the ease of starting up. Generally speaking, the colder the weather, the more work a motor can do without over-heating. In the case of steam engines, it is well known that in extremely cold weather it is sometimes necessary to delay operations while the engineer fires the boiler to "get up steam." An electric motor is rated at a certain horsepower and will deliver this power without exceeding a certain temperature rise above the temperature of the surrounding atmosphere. This is based on an air temperature of 40°C. (=72°F.) and the motor is guaranteed not to exceed a certain temperature above 40°C. Obviously, if the surrounding air is 20°C. instead of 40°C., the motor will run cooler. In cases where the temperature exceeds 40°C., motors operate without injury due to the margin inherent in the design of the motor.

(F) Safe-guards can be easily provided. Due to the small space taken up by a motor and its control equipment, it is that much easier to provide necessary guards against contact with moving parts by workmen or unauthorized persons. Practically all control equipment can be provided with totally enclosing cases so that it is impossible for operators to come in contact with live parts accidentally.

(G) Electric drive is convenient and clean. This feature appeals very forcibly to the new user of electric power. Two or three small wires brought from the power mains to the motor and control is all that is required. The easiest and cheapest way to do this on temporary work is to string the wires overhead, and if this is not convenient, they can be placed under ground. There is no smoke nuisance, no objectionable exhaust gases, and almost an entire absence of noise in an electrical

installation. Also, the responsibility of furnishing power is taken out of the builder's hands entirely. He buys current from the public utility, and it is up to the public utility to deliver it.

From the motor manufacturer's viewpoint, the equipment used by building contractors can, in general, be divided into two classes: first, machines like hoists, which require motors to start up and run while a load is being hoisted and then stand idle, and second, machines which run practically continuously driving such machines as bucket elevators, pumps or concrete mixers.

In purchasing motors, it is to the advantage of the user to consider the service on which it is to be applied and select the motor which is best fitted for the work in hand.

If the contractor purchases power from the central station, and he has a motor which runs continuously all day under full load, it is to his advantage to have a machine that is as efficient as possible because this will keep his power bill down. On the other hand, efficiency is not a factor for a hoist motor which starts and runs for 20 seconds hoisting a load and then shuts down for several minutes. The important item in a drive of this sort is to have a motor which can meet the situation when an extra heavy load must be hoisted and which will not "lay down on the job."

A third type of drive might also be cited which is similar to the type first mentioned in that it runs continuously but sometimes requires high torque to start. Such a device is a conveyor. After being shut down all night in cold weather and the lubrication is stiff or frozen, it requires considerably greater torque to start than after it has been running long enough to warm up the bearings.

For each of these three types of drive there is usually one particular type of motor which is best suited for the work.

The application engineers of any reputable motor manufacturing company stand ready to recommend the best motor and control for the work to be done, and at no additional cost to the purchaser.

Bates Valve Bag Offices Moved

REMOVAL of the executive offices of the Bates Valve Bag Corporation has been announced. The new quarters are at Suite 2700, 35 East Wacker Drive, Chicago, Ill.

Birch to Manage Beaumont Detroit Office

THE R. H. Beaumont Co., 319 Arch Street, Philadelphia, Pa., has announced that George T. Birch, recently connected with the home office, has been transferred to the Detroit office, 901 Kresge Building, and will act as District Manager

of that territory. The R. H. Beaumont Co. specializes in skip hoists and drag scrapers for sand, gravel and crushed stone.

Cauble Joins Highway Trailer

L. M. CAUBLE, formerly with the Dealers' Equipment Co. of Chicago, distributors of Fordson, tractors and equipment, as Sales Manager has joined the Sales Department of the Highway Trailer Co. of Edgerton, Wis., and will be connected with the Chicago branch at 1532 West Van Buren Street, Chicago, Ill.

Current Business Conditions

Analyzing Current Data from the Standpoint of the Contractor

Edited by GEORGE E. MacILWAIN, Business Economist

The Year's Profits

HEREWITH is presented a chart on Business Profits for the first nine months of 1927. The picture for the whole year will not be very much different. "Retail Trade" and "Food Products" and "Utilities" are the only ones of the group that will improve their position during the rest of the year, as compared with the first nine months.

The picture raises the question: Have we not actually been passing through a period of depression the past few months? Forecasters all over the country have been talking about the *prospects* of such a period. What if we have already had it? "Profitless Prosperity" is Colonel Ayres' phrase. Since profit is the aim of being in business at all, perhaps its general absence as compared with 1926 may amount to depression.

It is highly significant of the situation in the motor industry that six motor companies, including General Motors, show a gain above 1926, while seven motor companies, excluding General Motors, show a very much larger loss.

Where Building Came From

The other chart shows where the alleged increase in Building Contracts really came from. Look at that little hair line above the line labelled "Total" and realize that this slight gain in contracts is due entirely to the big record of public activities of various sorts.

The year's record, when it comes out, will not show much change over the position shown in the chart, except that "residential" will probably show still further losses.

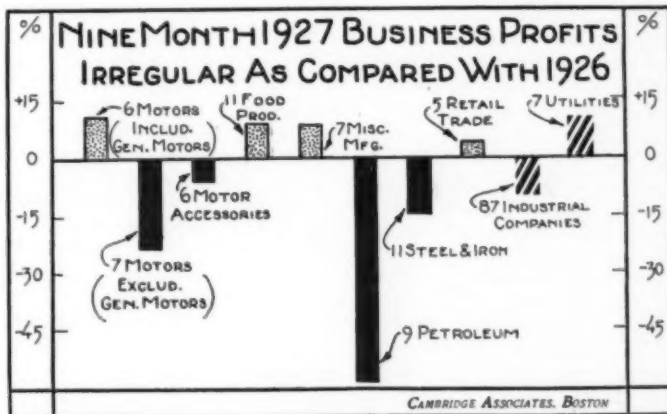
Contractors who feel dissatisfied with 1926, if there are any such, should realize that during this entire year they have been enjoying a hold-over of activity beyond that enjoyed by many building lines. We have been and still are in a period when all kinds of public works are going strong. These activities were the last to be affected when building activity began to boom. Naturally, they are the last to be affected when the general building volume starts to decline.

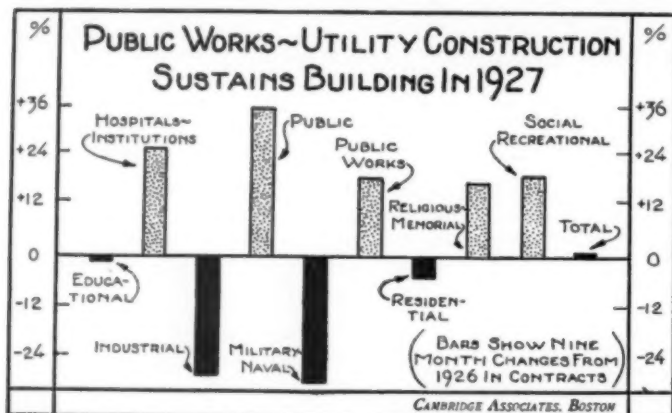
The question is as to what 1928 will do to Contractors and to building in general. Prophets are saying right now that the total of building in 1928 will be above 1927. Are the prophets right?

Personally, I feel that the total of business done in 1928 is likely to exceed the levels of 1927. I look for the greatest help in that achievement from the automobile business. I expect that the farm situation may not be quite as good next year as it has been this year and I look for a moderate decline in building contracts when 1928 is totalled up.

The most natural outcome is that the decline in building contracts, which has so far been absent from general contracting, should get at that business in 1928. New England's record

YEAR'S
PROFITS
DISAPPOINTING
IN
SOME LINES,
AND
NOT LARGE
IN ANY





**PUBLIC
WORKS SAVED
1927
FROM
LESS BUILDING
THAN 1926**

may be above 1927, on account of a large amount of work to be done in the flood districts. There are certain sections, where the farmers are enjoying a new prosperity, which will do more work in 1928 than they have done this year. But, if my estimate of 1928 is correct, such gains—small when totals are taken into account—will be offset by more substantial declines in the sections that have been most active during the past year.

Price Trends for Next Three Months

Two of the leading business services look ahead at prices of materials for the next three months. They picture lower prices for Brick and Glass. Purchases of these items should be for immediate needs only. They expect level or higher prices for: Iron and Steel, Cement, Lumber (Hard and Soft) and all kinds of fuel. Purchases of these items may well be made for some months in advance.

Business in 1928

My estimate of business prospects for 1928 runs about as follows: I think that 1928 will get a good start by the middle of February. The Spring will open up well. The summer drop will be rather more marked than usual, because the large areas planted to the various crops are likely to make lower prices for farm products probable. The fall trade will be either much better than 1927 or worse, depending on the political situation. If the right men are nominated and, better still, if the right man is elected in November, the year will wind up in grand style. My feeling is that the political situation promises to be a bull influence in business. The total of business in 1928 promises to be in excess of 1927.

Wages in 1928

My feeling is that wages in the building and contracting business are due for readjustment in 1928. General Wages now stand at 259.5, as compared with 100 in 1913. Building Wages are at 257, if we rate 1913 at 100. That is, building wages are practically abreast of wages in general. Moreover, many wage agreements expire the coming spring.

There are two possible results of this condition. One is lower wages. Everything points in this direction. The present wage standards, the over supply of labor in all lines, the easing off in demand for labor—everything that affects the great law of supply and demand gives the basis for lower wage standards.

In addition, there is the likelihood that efforts to make new wage agreements on a lower basis may result in strikes. Labor has had the high wage so long and has adjusted its budget so thoroughly to it, that it will resist any downward tendency.

Be on guard, however, against getting caught by long expensive strikes. The Contractor who is in a section where the contracts are taken before the wage agreements are signed is unfortunate. We are not going to have labor peace forever. Do not forget that men know how to strike. They have not been doing it of late and we are lulled into a sense of security on that score. 1928 will show more strikes than we have had the past few years. Everybody who has an eye to the situation agrees on this. Take your men into your confidence. Sell them on the idea of *work*, with lower wage rates, as compared with *no work* and present wage rates.

And above all, resist to the last any effort to boost wages in 1928!

Legal Points for Contractors

These brief abstracts of court decisions in the contracting fields may aid you in avoiding legal difficulties. Local ordinances or state laws may alter the conditions in your community. If in doubt, consult your own lawyer

Edited by A. L. H. Street, Attorney-at-Law

Election Day Holidays

A state has no right to enact a law providing that employees in private industries shall have two hours off on election days for the purpose of voting, without deduction of pay, holds the Illinois Supreme Court in the case of *McAlpine vs. Dimick*, 157 North Eastern Reporter, 235. Annuling such a provision in the Illinois primary election law, the court takes the position that it violates the constitutional guaranty against deprivation of property without due process of law. It is intimated that a law may interfere with private employment to the extent of giving employees a voting holiday, whether the employer likes it or not, but it is distinctly held that the employee cannot have both his holiday and his pay for the time taken off unless the employer is willing.

Damages for Delaying Completion

Where a building contract is mute as to what damages shall be paid in case the job is not completed by a specified time, on what basis should damages be computed?

This question is clearly answered by the United States Circuit Court of Appeals, Ninth Circuit, in an opinion handed down June 27, 1927, in the case of *Mission Marble Works vs. Robinson Tile & Marble Co.*, 20 Federal Reporter, 2d Series, 14. The decision is that ordinarily the damages are to be measured by the rental value of the building for the period of the delay. An opinion of the Connecticut Supreme Court of Errors is quoted as follows:

"Where a builder delays the construction of a building, and the owner is thereby compelled to continue his occupancy of, and to pay rentals for, leased premises, the amount of such payments may well constitute the real injury arising from the breach of contract, and, if so, they would be properly recoverable. If it be shown that the continued occupancy of the leased premises resulted in savings to the defendants [the owners] in the expenses of operating their business, such savings should be offset."

Contractors' Delay Not Proved

That an owner's architect is not all-powerful in determining the rights of a contractor is exemplified in the opinion handed down June 27, 1927, by the United States Circuit Court of Appeals, Ninth Circuit, in the case of *Mission Marble Works vs. Robinson Tile & Marble Co.*, 20 Federal Reporter, 2d Series, 14.

The suit was brought on a subcontract under which tile was furnished defendant. Defendant counterclaimed damages on account of a delay in performance of the contract by plaintiff; the architect having refused to approve the final payment due defendant until damages for the delay were paid the owner, a bank.

The court disallowed the counterclaim on the ground that there was no proof of damage through the delay (evidently the contract did not expressly provide for the payment of damages in case of delayed performance). Holding that an award of damages could not rest upon the architect's action the court said:

"It is well settled that proof of damages must be reasonably definite and certain. The contract between the bank and the defendant did not vest power in the architect to determine any question of damages to the bank for delay or to withhold payment on account thereof. The architect's authority was limited to computing the amounts payable in installments in each month, the remainder to be paid upon his certificate that the work was satisfactorily completed and a showing that all bills and claims had been paid."

Seller of Material for Special Use Under Plans Furnished by Him Warrants the Structure

A company sold tile for use in constructing grain bins, and furnished a design and detailed drawings for construction of the bins. By doing so, the company became an implied warrantor that the bins would be fit for the intended use, holds the United States District Court for the Eastern District of Michigan in an opinion handed down May 6, 1926, in the case of *Maritime Trading Co. vs. J. M. Preston Co.*, 20 Federal Reporter, 2d Series, 214.

Holding the seller to be liable for damage sustained by the owner, through defects in the bins, resulting in partial collapse and leaks, the structures having been erected in a good, workmanlike manner, in accordance with the designs and drawings furnished by the seller of the tile, the court said:

"A careful consideration of the contract, * * * together with a consideration of the plans submitted by the defendant company, * * * indicates clearly that the defendant obligated itself to do something more than to merely furnish material. It undertook to furnish a design and detailed drawings for construction. It knew the use to which the plaintiff expected to put the bins, and it

undertook to furnish the design for the construction of such bins and the material necessary, so that bins when constructed would be fit for the use intended."

Contractor's Right to a Mechanic's Lien for Profits

A decision of the Arkansas Supreme Court, handed down June 20, 1927, shows that in that state and some other jurisdictions a building contractor's right to a lien to cover his profits on a job depends very much upon whether they are separated from the cost of labor and materials furnished by him. The court said (*Shaw vs. Rackensack Apartment Corporation*, 295 South Western Reporter, 966):

"This court has held . . . that a contractor is not entitled to a lien under the mechanic's lien law for profits, but only entitled to a lien for labor that was actually performed by him or for material furnished by him. . . .

"If one makes a contract to furnish material and perform labor for a certain amount, and the contract provides that above that amount he is to have a certain per cent or a certain amount of money for his profit, of course he could have no lien for a sum due him for profit. But the contract in this case is not like that. This is a contract to furnish the labor and material for a certain sum of money, and it would be wholly immaterial whether the contractor made a profit or suffered a loss. He has a lien for the material furnished and the labor performed in making the improvement for the amount contracted to be paid. When one furnished material to go into a building at a certain price, it is wholly immaterial whether the material furnished by him cost him more or less or whether it cost him anything at all. He might own the material already, or he might have acquired it without cost, but, when he agrees or contracts to furnish this material and labor for a certain price, he then has a lien for the unpaid part of the contract price on the improvement made."

Land Filling Contract Interpreted as to Provision for Paying for "Space Filled"

The city of Boston let a contract for additional filling to be placed on a shore front for park purposes, based upon levels of the site existing in 1922. The contract also specified that "The quantity to be paid for shall be determined by measurement of the space filled . . . after the material has been leveled off and rolled." Interpreting the contract in an opinion handed down June 29, 1927, the Massachusetts Supreme Judicial Court said in the case *Morse vs. City of Boston*, 157 North Eastern Reporter, 523:

"It appears that, owing to the soft and unstable character of the substance upon which the fill and loam were to be placed, a large portion of such fill and loam had settled below the level of the land as that level existed in 1922, when the contract was made. . . .

"At the outset the question presented is, whether

under the terms of the original contract, the risk of settlement and loss of material by erosion should be borne by the city or by the Coleman Co. [the contractors]. . . . It is agreed that the contractor was required to deliver and spread, fill and loam up to the grade shown on the contract plans. The plaintiffs contend that 'space filled' means space filled above the 1922 levels. It is the contention of the Coleman Co. that 'space filled' means all the space filled, whether above or below the 1922 levels, because such space must be filled in order to raise the surface to the desired grade as shown on the contract plans. The provision in regard to measurement according to space filled when leveled and rolled well may have been inserted in the contract merely to relieve the city from paying for material lost by shrinkage, due to leveling and rolling, without intending to place the risk of such loss on the contractor. . . .

In the case at bar the words 'space filled' in common acceptance can only mean making an empty space full, and, as applied to the contract read in the light of all the circumstances, mean that the contractor shall be paid a sum of money which shall be measured by the space filled, rolled off and leveled above the levels of 1922. . . .

"The risk that a part or even the whole of the material placed by the contractor upon the 1922 levels might sink below those levels was one that fell upon the contractor and not upon the city of Boston."

Repairs on Equipment Covered by Bond

A bond securing performance of a contract to construct state highways in West Virginia bound the contractor to pay the claims of laborers and materialmen. The question arose as to whether or not this protected a motor maintenance company that made repairs on trucks used in the work. The United States Circuit Court of Appeals, Fourth Circuit, said (*Maryland Casualty Co. vs. Ohio River Gravel Co.*, 20 Federal Reporter, 2d Series, 514):

"It is undoubtedly true that repairs which add materially to the value of the equipment and render it available for other work are no more within the protection of the bond than the equipment itself; and one, for instance, who supplies a tire or a motor for a truck is no more entitled to recover under the bond than one who furnishes the truck itself. On the other hand, there are repairs of an incidental and inexpensive character, . . . which do not in any true sense add to the value of the equipment, but are incidental to the carrying on of the work and represent merely ordinary wear and tear or its equivalent. . . . The labor done in making such repairs is in reality labor done in the carrying on of the work, and we think should be treated as such. Thus a blacksmith who sharpens the plows and drills or repairs the carts used in making an excavation would undoubtedly be protected the same as other laborers, . . . and we see no difference between his case and that of a mechanic who keeps in repair and running condition a fleet of trucks used on the job."

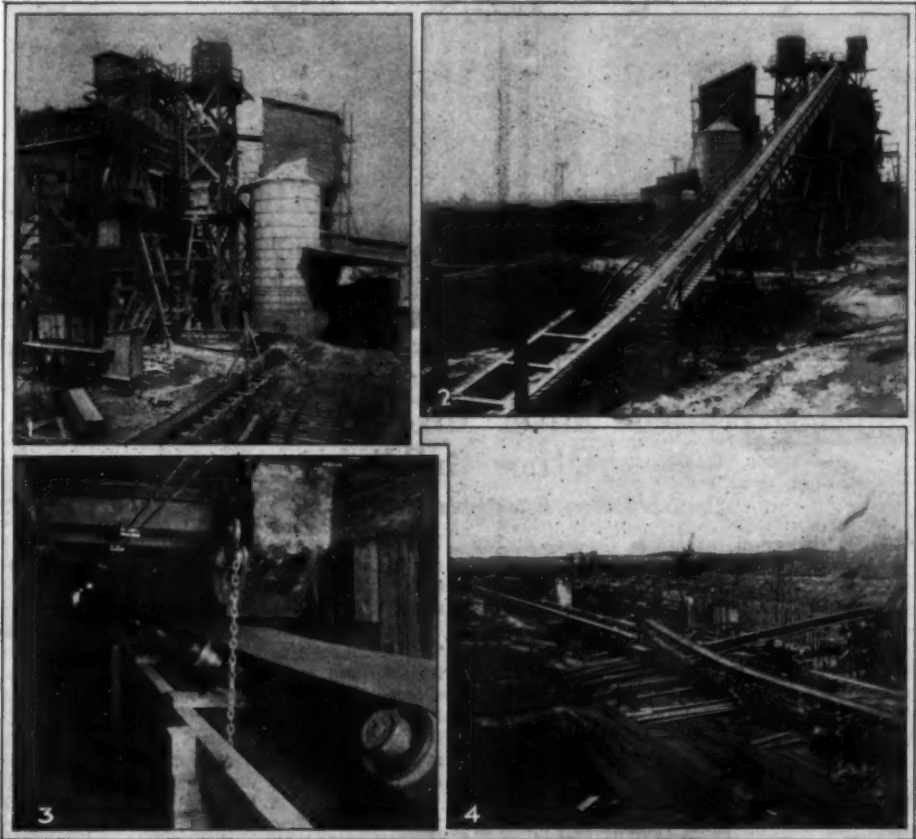
Belt Conveyors for Handling Concrete

Material May Be Saved and a Stronger Concrete Obtained by Having the Proper Mix

BELT conveyors which lend themselves particularly to the economical and efficient handling of mixed concrete, in which a combination of materials and water of proper quantities may be used to obtain the greatest strength, are being manufactured by the Link-Belt Co., 300

over any other method he had tried, each as elevators, spouts, buggies and the other regular methods of standard practice.

This is of particular interest to contractors, who, in these days of close competition and high labor costs, are always looking for economical methods



CONVEYOR EQUIPMENT IN THE CONSTRUCTION OF THE WEST SIDE SEWAGE TREATMENT WORKS FOR THE SANITARY DISTRICT OF CHICAGO

1.—General view of cement unloading and silo storage plant, sand and stone storage and concrete mixing tower used by the T. J. Forschner Contracting Co. of Chicago, Ill. 2.—View of the 24-inch inclined reclaim Link-Belt belt conveyor for delivering sand and stone from storage to hoppers over the concrete mixing plant. 3.—View through the reclaim tunnel showing 24-inch Link-Belt belt conveyor reclaiming sand and stone from storage to hoppers over the concrete mixing plant. 4.—General view of the concrete distributing belt conveyor delivering material to the pumping station foundation.

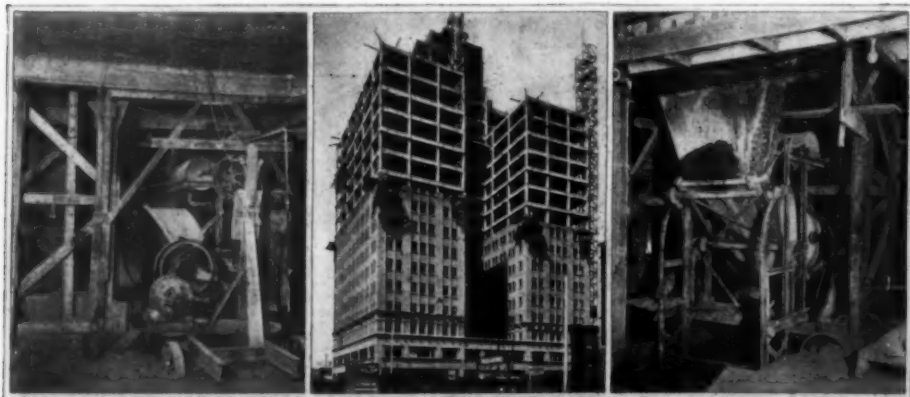
West Pershing Road, Chicago, Ill. It is claimed by one of the clients of this company, who had a contract involving about 100,000 yards of concrete, that through the use of a belt conveyor handling mixed concrete he was able to save considerable in cement alone, and a great deal in handling costs,

and machines. Since the amount of the cheapest material used in mixing concrete—the water—determines its strength, with a given combination of materials there is one particular volume of water that will produce a concrete of maximum strength. Decreasing or increasing the volume of water from

this amount decreases the strength of the concrete.

One cubic foot of cement, 2 cubic feet of sand and $6\frac{1}{2}$ gallons of water will give a mortar having a compression strength per square inch of about 3,700 pounds in 28 days. Keep the same amount of cement, sand and water, and add a cubic

foot of gravel, and the strength will be the same. Add 2, 3, or even 4 cubic feet of coarse gravel, and the strength will still remain the same. This shows the economy in material and the increased strength in concrete that can be obtained by having the proper mix.



THE 14-YEAR-OLD CONCRETE MIXER AND THE 21-STORY MILAM BUILDING WHICH IT HELPED TO BUILD

Fourteen-Year-Old Mixer Mixes Concrete for 21-Story Office Building

Unusual Record Established in San Antonio, Texas

THE building of the Milam Building at San Antonio, Tex., has attracted wide attention throughout the building industry. A great commercial tower of 21 stories and basement, occupying a space of 113 x 117 feet and costing approximately \$2,000,000, has been built for the Travis Investment Co. by the L. T. Wright Construction Co., both of San Antonio.

Over 14 years ago, when the L. T. Wright Construction Co. required a new concrete mixer to take care of their ever-increasing business, they purchased on February 15, 1913, a Smith 113-S 2-sack mixer, from the Alamo Iron Works. This mixer has been in almost constant use for these fourteen years on some of San Antonio's largest building projects where speed and dependability were important factors. On the 21-story Milam Building it poured all of the concrete, aggregating

10,000 cubic yards, without a minute's delay for repairs, according to H. G. Englemann, Superintendent of Equipment for the L. T. Wright Construction Co.

On this particular job, as shown in the illustration, the mixer was placed in the basement of the building, and as concrete was mixed it was discharged directly from the mixer into a hoisting hopper to be raised to the floors above and delivered into forms by chutes. It is estimated that in the life of this mixer it has poured approximately 100,000 cubic yards, a truly enviable record.

According to J. A. Millburg, Alamo Iron Works, San Antonio, Texas, this organization not only sold the Smith Mixer to the Wright Construction Co. over fourteen years ago, but also supplied the reinforcing steel and ornamental iron work for the Milam Building.

Mundy and Dobbie Unite Sales Forces

THE Mundy Sales Corporation, 30 Church Street, New York, Charles H. Foster, Secretary, has announced that the Dobbie Foundry and Machine Co., and the J. S. Mundy Hoisting Engine Co., have united in their sales efforts. The Mundy Sales Corporation hereafter will handle all sales for both organizations.

Superior Supply Represents Northwest

THE Superoir Supply Co., 1850 South Kostner Avenue, Chicago, Ill., has just closed negotiations to represent exclusively in their territory the Northwest Engineering Co. of Green Bay, Wis. The company is now located in its new plant and will carry in stock in Chicago, cranes, draglines, shovels and pull shovels.

Hunter Offers Better Service to Michigan Contractors

THE Hunter Machinery Co., of Milwaukee, Wis., announces that its Michigan Co., with plant and offices at Grand Rapids, has been so successful in Western Michigan that practically all of the accounts it represents in Western Michigan as well as Wisconsin, have asked it to take over the Eastern Michigan and Detroit territory for them. As a result, the manufacturers have, in most cases, closed their own offices and the enlarged company is taking over such of their personnel as it can use.

The Hunter Machinery Co. in Western Michigan out of Grand Rapids won first prize for the Chain Belt Co. in its annual Derby for the sale of concrete mixers, against many larger territories throughout the country. It also increased the business of such concerns as Sullivan Machinery Co., Northwest Engineering Co., Blaw-Knox Co., etc., far beyond anything ever done before in that section, despite the fact that it has been an off year in Michigan, according to Morton R. Hunter, President.

The capital of the Hunter Machinery Co. of Michigan, which is a separate corporation from the Hunter Machinery Co. of Wisconsin, has been increased by \$110,000, and the new stockholders are practically the same as the previous ones. A site was purchased in Detroit, at 221-241 S. Waterman Avenue, that is about three and a half miles from the city clubs, hotels, etc., out Fort Street, and close to the L. C. L. Railroad terminals, with a private siding of its own on the Michigan Central.

A brick, concrete and steel building will be erected, which will have a large display room in front, with parts service room, shop and warehouse on the main floor, and offices on the floor above.

The lines handled exclusively by the company for all of Michigan are: Chain Belt Co., Blaw-Knox Co., Clyde Iron Works, Durex Co., Atlas Engineering Co., A. W. French & Co., Northwest Engineering Co., Sauerman Bros. Co., Sullivan Machinery Co., Aeroil Co., Cleveland Wheelbarrow Co., Pulsometer Steam Pump Co., C. A. Londelius & Co., Reynolds Portable Furnace Co., Rowe Mfg. Co., and a number of other supply lines similar to those handled in Wisconsin.

The officers of the company are: Morton R. Hunter, president; B. E. Uebele, vice-president, in

charge of sales for Michigan, with headquarters at Detroit; T. G. Abrams, treasurer, with headquarters at Detroit. The Detroit organization will include Walter Evans, who for the past year and a half has been with the Northwest Engineering Co. at Detroit and previous to that with the Anderson Tool & Supply Co. for six and a half years, covering the same territory that he is going to take over for the Hunter Machinery Co.; Walter Duncan, who has been with the Blaw-Knox Co. at Detroit for the past two years and, previous to that, was with one of the largest contractors in the country as superintendent of construction; Joe L. Koss, who for the past four years has been selling construction equipment in Detroit, and before that was in the contracting field; Alfred Johnson, who for the past twelve years has been selling construction equipment in Detroit, and, as his assistant, George Moore, formerly with the Andrae Electrical Co., of Milwaukee. Also there are Francis Helz, assistant master mechanic at Milwaukee, who has been transferred to Detroit as master mechanic; Anthony Geniger, formerly timekeeper in the company's Milwaukee shop, who has been transferred to Detroit in charge of shipping and parts service; and a number of mechanics and office workers.

George Swart, of Grand Rapids, who has been assistant to Mr. Uebele, will be in charge of the Grand Rapids office. Leon Lutz, who has been stationed at Jackson, Mich., will be moved to Grand Rapids and will work out of there. The Grand Rapids organization also includes two other salesmen and office and shops forces.

A large stock of construction equipment will be kept on hand of the various lines the company represents at Detroit as well as Grand Rapids. The Detroit stock will be the largest construction equipment stock ever maintained in that city. This latest move makes the Hunter Machinery Co. one of the largest distributing organizations of construction machinery and equipment in the United States. The growth of the company has been steady until it now reaches several million dollars. The ambition of the company is to reach 100 per cent service to their particular field and territory, for they contend that the usefulness of any business ceases when it does not deliver the highest degree of satisfaction within its power to give to its trade.

Too Much Gravel as Bad as None

THE South Dakota State Highway Commission recently reported a case in which it was using 1,500 yards of gravel to the mile on a 24-foot roadway. The job was such a success that local officials decided to gravel a township road leading to it, which has a good grade, 18 feet wide. On the theory that if a little gravel was a good thing, more would be better, they put 1,800 yards to the mile, and now have a road that is about as unsatisfactory as it could be and that will require years of travel and the wasting of a large amount of sand and gravel in the ditches before the road

becomes a satisfactory highway for horse-drawn vehicles or automobile traffic.

The comment is made that if the amount placed on one mile had been spread over three miles, a splendid road three times as long would have been the result. All experience demonstrates that for a 24-foot grade with heavy traffic 1,200 to 1,500 yards is ample. For a road with light traffic, 600 to 900 yards is as much as should be put on at first. When this has worked into the subgrade thoroughly, the application of 200 to 400 yards makes the road ideal if properly maintained.

Trailer Dump Wagons With Hitch for Tractor Haulage

Unique Combination of Crawler Traction and Trailer Haulage Proves Economical

ON Minnesota Trunk Highway No. 2, just east of Perham, Minn., there are ten tractors and ten tractor dump wagons replacing some 30 to 35 horse-drawn outfits in handling heavy grading. Not only have these units done more, but they have done better work than could have been done by the old methods and at a cost that could not have been attained with horse-drawn outfits. The Strom Construction Co. of Gary, Minn., has the contract for grading several miles of this highway. Most of this work is being done on new location especially between Perham and New York Mills, where the new road is following closely the right of way of the Northern Pacific Railroad instead of winding here and there as does the old highway. Hills are being cut, valleys are being filled and a broad roadway without excessive grades or sharp curves will soon be realized. Some of the cuts are 15 or 20 feet deep and many of the fills are equally high. The soil over most of the project ranges from a light sandy loam to almost pure sand and is about as difficult to handle as is possible to find.

The contractor, realizing that there would be intense competition on this contract, investigated various methods of handling dirt and finally decided that the cheapest possible method was to use tractors in place of horses. Accordingly, an order was placed with the Gary Implement Co., Gary, Minn., for five McCormick-Deering 10-20 tractors and five Lenhart tractor dump wagons which are attached to the tractor with a Trail-It hitch. These five outfits were immediately sent to Perham and put to work. A Russell elevating grader drawn with a 10-ton Caterpillar tractor is used to load the wagons, so successful was the operation of the five units that the contractor placed his duplicate order with the Gary Implement Co. and now there are ten outfits working on the job.

The efficiency of these tractor-drawn dump wag-



MCCORMICK-DEERING TRACTOR WITH TRAIL-IT HITCH HAULING LENHART DUMP WAGON

ons is demonstrated by the fact that in one day's operation where the maximum haul was 2,200 feet, and the average haul 800 feet, seven of these outfits handled 1,054 cubic yards in ten hours. According to H. J. Degerness, Superintendent of Work at Perham, it would have required at least 21 horse-drawn outfits to move that quantity of dirt.

Not only do the tractors do this grading work at a lower cost than is possible with horse-drawn outfits, but they do a much better job, especially on heavy fills. The wide tires of the tractors and the dump wagons serve as packers and when the fill is completed there is little or no further settlement. This is important from an engineering standpoint because it is quite common for engineers to require fills to be made in layers 5 to 6 inches thick and each layer to be compacted by the use of a heavy roller. This is work which the tractor does even more efficiently than does a roller because the spade lugs assist materially in compacting the earth.



GRADING OPERATIONS ON MINNESOTA TRUNK HIGHWAY NO. 2 EAST OF PERHAM

A 10-ton Caterpillar tractor was used to draw the Russell elevating grader which loaded the Lenhart dump wagons hauled by McCormick-Deering tractors

The Lenhart tractor dump wagon made by the Lenhart Wagon Co., Minneapolis, Minn., is built of steel in every part except the body itself. The steel wheels, steel axle, 12-inch steel channel reinforcing of upper body sides, steel bracing and cast steel gooseneck are all built to withstand the hardest usage and give the wagon great strength. Timken roller bearings are used on the axles.

The Trail-It hitch, made by the Trail-It Co., 2516 Wabash Avenue, St. Paul, Minn., is an auto-

matic fifth wheel coupling. It is spring-mounted throughout and gives the stabilizing action necessary for handling heavy loads in rough ground conditions yet still provides ample flexibility. It carries about one-third of the gross load which gives the weight on the drive wheels needed for traction and it distributes a part of the load to the front wheels. The steering control of the tractor is sure at all times and right angle turns are made so that the wagon pivots on its axle center.

Modern Skyscrapers Are Headstones for Men Killed During Construction

"IN all too many cases the modern skyscraper, commonly looked upon as a monument to the skill of the architect, engineer and builder, is really a headstone for the men who were killed during the construction period," said Major W. R. Richards, of the Associated General Contractors, in an address before the Sixteenth Annual Safety Congress held in Chicago. It is estimated that every year the construction industry in the United States is loaded with a charge of \$250,000,000 in personal and property damage.

The construction accident statistics, as compared with those of manufacturing plants, are anything but encouraging from the standpoint of the contractor and insurance rates are correspondingly high, yet contractors, with few exceptions, have refused to follow the examples set in other industries where accident prevention has been found successful. They have neglected to take part in the movement which has placed safety work in the United States twenty-five years ahead of that in other countries, according to Major Richards.

The Associated General Contractors are attempting to make accident prevention an everyday objective, not only because of its economic benefits, but also because of the humanitarian angle of the problem. Fewer accidents mean lower insurance rates, increased efficiency and greater production. On the other hand, it is the humanitarian angle of the safety campaign that appeals most to the employee. It creates a common bond between the employer and his men which is absolutely essential for the successful operation of accident prevention work. Considered from this viewpoint fewer accidents mean a saving of lives, prevention of unemployment, illness and poverty, and raised morale among the workmen. The two ideas of economy and moral obligation, however, are so interrelated as to be inseparable. Whatever helps the employer also benefits the employee and vice versa.

The methods of employing accident prevention

are practically the same in all cases, and should be carried out along standard lines instead of being put on a plane of mystery. It must be made part and parcel of the contractor's business and worked out in a practical way. In fact, the best plan is to use a good common sense method. Properly applied, these are flexible—they fit any job and are adaptable to any kind of construction. Someone said that it is the "horse sense of the driver that will save accidents, not the horsepower of the car," and that statement is applicable here.

The first essential of accident prevention is the sincere interest of the employer in the project. Safety must begin at the top. The success of the program will depend largely on the confidence the "big boss" has in the activity and his ability to inspire that confidence in each and every member of his organization. If the employer will stop for a moment to consider how he would feel and act were he in his workmen's shoes, he will be eager for the success of accident prevention and will not postpone taking up the campaign.

Of the so-called major accidents, the predominating causes are falls of various sorts—falls from scaffolds and ladders, falls from buildings, falls from runways, floor and stairs, falls from other elevations, falls into floor openings, falls into excavations, falls into quarries or pits, and falls on the level. Many very serious injuries result in men being struck by falling objects, while others are brought about by workmen stepping upon or striking against various objects.

To overcome these difficulties, the safety engineer should work with the operating executive in formulating and applying a set of company standards or rules covering both safety of equipment and safe practice. He should also keep in touch with safety men of other construction companies in order to pick up all available information regarding new and improved methods, and then apply these methods in his company.

McNall New Advertising Manager for Speeder

THE Speeder Machinery Corporation, Cedar Rapids, Iowa, manufacturers of Speeder shovels, pullshovels, skimmer, cranes, draglines and backfillers, has announced the appointment of Edgar McNall as Advertising Manager. Mr.

McNall for eight years was connected with the advertising departments of Cedar Rapids newspapers. He will be in charge of the greatly enlarged advertising program which the Speeder Corporation plans for 1928, and will render advertising assistance to Speeder distributors throughout the United States and Canada.

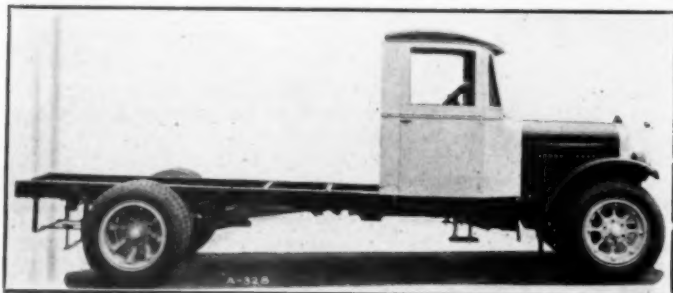
A New 1½- to 2-Ton Truck

New Model 30, 6-Cylinder Truck Has Enclosed Cab and 160-Inch Wheelbase

A NEW 6-cylinder, 1½- to 2-ton truck has recently been placed on the market by the Ruggles Motor Truck Co., Saginaw, Mich., to meet the demand for a 6-cylinder truck of this capacity at a low price.

Ample power for this Model 30 truck is supplied by the Lycoming 3¼ x 4½ 6-cylinder engine with a 4-bearing crankshaft and full force-feed

inch depth and ¾-inch flange. Jacox steering gear, Zenith carburetor and Remy ignition are standard equipment. The truck is equipped with 32 x 6-inch single heavy-duty cord tires in front and 32 x 6-inch dual heavy-duty cord tires in the rear on Van steel wheels. With the standard wheelbase of 160 inches, there is a distance of 81½ inches from the back of the cab to the center



THE
RUGGLES MODEL 30
CHASSIS
WITH COUPE
CAB

lubrication. This engine is cooled by means of a fan and centrifugal water pump circulation.

The transmission and clutch are Brown-Lipe model 31 and an Eaton No. 1504 semi-floating rear axle is used. The standard final gear ratio is 6.37 to 1 and the drive is through I-beam section radius rods. The frame is of 9/32-inch stock with 5/8-

line of the rear axle which makes an excellent balance for a 12-foot body.

The Model 30 is supplied with the Ruggles coupe cab as standard equipment with the idea of embodying real comfort for the driver. Some of the features of this cab include slanting, ventilating windshield, full-length doors, window regulators.

A Portable Saw Rig

Tilting Table and Close, Compact Design Are Features

WITH the idea in mind of producing a better tool for contractors, C. I. Longenecker, 251 Reed Street, Milwaukee, Wis., has designed a new portable saw rig, the Durex. Facility in handling, greater production, greater variety of uses and safer operation are the qualities which have been incorporated in this new equipment.

The table tilts, thus widening the scope of uses of the machine. The saw travels in a straight line, providing the same cutting depth for the entire length of the stroke and greatly increasing the cutting capacity. Power is supplied by an 8-horsepower, 2-cylinder Le Roi gas engine which is mounted under the table where it is fully protected. This construction makes for a close, compact tool that requires little floor space.

Safety—an important thing around wood cutting machinery—is assured by the design of the saw rig. The cut under the frame permits the operator to stand in a natural position when using the saw. The saws are fully protected and when ripping, the saw is continually guarded, this feature working automatically. The cross cut guard also gives full protection to the saw, thus affording maximum protection to the operator.



THE "DUREX" PORTABLE SAW RIG WITH
2-CYLINDER LE ROI ENGINE

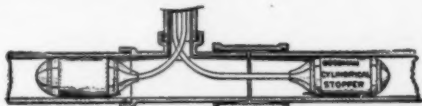
Cylindrical Stoppers for Water Main Repair

Bag is Easy to Insert and Operation is Simple

A CYLINDRICAL stopper for use in water main, sewer, drain and gas pipes to hold back leakage when making connections with or repairs to old mains when the gate valves leak, is being developed by the Safety Gas Main Stopper Co., 523 Atlantic Avenue, Brooklyn, N. Y. This stopper will hold back a water pressure of 10 pounds on sizes up to 20-inch pipe. The total is extremely simple and can be inserted in the pipe and operated by anyone.

The stopper consists of an inflatable bag with a rugged water-proof casing. It may be inflated to a high internal pressure and it will hold against a pressure that will supply the second story. Steam boilers may be operated within the territory that is shut off. The broad central zone makes contact with the wall of the pipe and keeps the bag from creeping or slipping in the pipe. Stiffeners in the casing insure the bag straightening out in the pipe as it is inflated. The loop on top provides an easy way of pulling the stopper out of the pipe when it is deflated.

The stopper will be found valuable for use



GOODMAN CYLINDRICAL STOPPER IN USE IN WATER PIPE

when making repairs and alterations to water mains. Leaky valves will not delay or hamper the work when this stopper is applied. It obviates the necessity of pumping water and the workmen are able to work on dry ground. When necessary, an extra length of tubing can be attached to the stem of the stopper and carried through a number of fittings. After all the joints have been run dry, the air in the stopper is released and the stopper withdrawn through the gate.

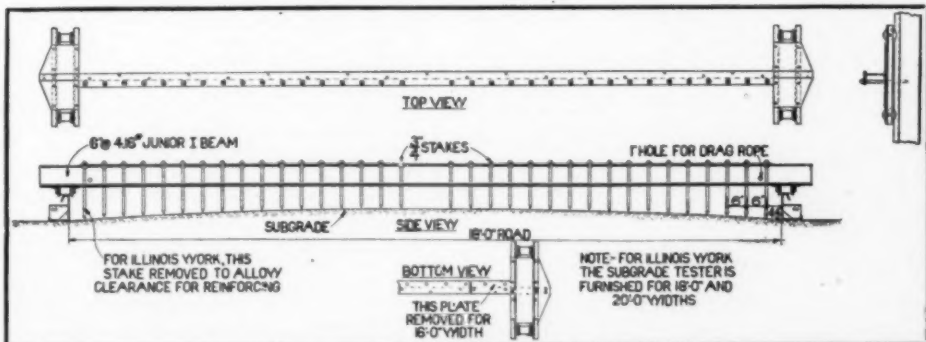
The method of using the stopper is simple. The bag is folded as any ordinary bag, inserted in the pipe and inflated. When finished, the air in the bag is released, the locking device loosened, the loop pulled on and drawn out.

A New Subgrade Tester

An Important Feature is That the Machine is Adjustable for Two Widths

A NEW subgrade tester has been developed by The Lakewood Engineering Co., Cleveland, Ohio, and is now on the general market.

to check the subgrade just before the concrete slab is placed. One of its most important features is that it is adjustable for two widths; either for



THE NEW LAKEWOOD SUBGRADE TESTER BUILT ACCORDING TO PENNSYLVANIA STATE HIGHWAY SPECIFICATIONS

This tester is in accordance with the standards recently adopted by the Pennsylvania State Highway Department.

This new piece of Lakewood equipment is used

16-18 foot or for 18-20 foot roads. The pins may be set to any desired cross section. In many recent instances such a tester has been recommended by engineers as a final check for the subgrade.

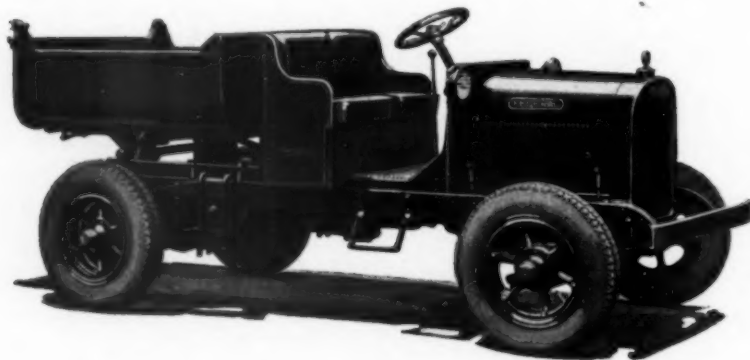
A Rugged, Powerful Truck for Road Building

It is Designed to Meet All Requirements of Road Contractors Everywhere

A RUGGED, powerful truck, designed especially to meet the most severe requirements of highway construction work, with varying chassis sizes, is being built by the Federal Motor Truck Co., Detroit, Mich. This Road Builder, Model T-20, has a capacity of 4,000 pounds in excess of the body weight and a wheelbase of 115 inches. Utmost strength and stamina to withstand constant pounding over the rough, unimproved roads that must be traversed and the unusually short turning radius that permits exceptionally fast and efficient operation in very close quarters, are

axle, contributes greatly to the long tire life which is one of the features of this truck.

The husky worm drive rear axle, with semi-floating shafts, is designed and constructed especially for the most severe conditions. The oversize bevel gear differential is mounted on large tapered roller bearings, and the entire axle is enclosed in a one-piece pressed steel housing. The big worm and worm wheel will function smoothly, silently and efficiently for many thousands of miles. In conjunction with the double cantilever type springs, the rear end of the truck is out-



**THE
FEDERAL
ROAD
BUILDER
CHASSIS
EQUIPPED
WITH AN
AUTOMATIC
DUMP BODY**

features that should make for efficient and dependable service.

The 49-horsepower, 4-cylinder, Ricardo head truck engine will easily pull up the steep grades from gravel pits and through the heavy going of sub-grades. In combination with the 4-speed amidship transmission and three optional rear axle gear ratios, this Road Builder is adaptable to widely varying conditions of load or territory.

Especially large truck type, 10-ply pneumatic cord tires, 32 x 6 inches front and 34 x 7 inches rear, give the truck traction to withstand the shocks of this work. The well-balanced chassis, carrying the center of the load ahead of the rear

standingly strong and rugged. These springs of special alloy steel are 2½ inches wide x 32 inches long and are very securely anchored to the frame and axle.

From radiator to tail light, this truck is said to be constructed entirely of truck units, each selected with a view to stamina, strength and adaptability to this work. Front bumper, oil pressure gauge, tools, jack, grease gun, speedometer and front tow hooks are standard equipment. Equipped with an automatic gravity dump body, this truck with its high speed operation should make a strong appeal to the experienced road builder and contractor.

One group of building contractors, by continuous and organized effort, has reduced accident outlay fifty per cent. Individual companies have earned as high as sixty-four per cent reduction in their insurance rates and several as much as thirty to forty per cent.

An Efficient, Economical Pipe Cutter

One Cut Often Saves the Price of the Tool

A TOOL for efficient and economical cutting of pipe in or out of the ditch is being manufactured by the Ellis & Ford Manufacturing Co., Detroit, Mich. It is a quick and safe means of cutting exactly where and when the cut is desired. It is made in two sizes; No. .01 cuts all kinds of pipe 4 to 8 inches and No. 1 cuts all kinds of pipe 4 to 12 inches. Every point in contact with the pipe is a cutting disc, thus necessitating the moving in but a small part of a circle in order to cut entirely around the pipe.

The operation of pipe cutting is simple with this tool. One cut in a ditch partly filled with water; one cut in a tight corner without disturbing other pipes or street work; a cut by divers under water, a hurry up repair job, cutting out a small section and setting in a new one—this is all that is necessary to make the operation complete. Many water companies have reported the cutter to have saved its cost on just one such job. While its use is for ordinary cutting of pipe, it is a most valuable tool should an emergency arise.

Preparation for the cutting can be made in a minute's time. To place the cutter in position in the trench, one of the thumb bolts is slipped out and the links are run under the pipe and locked

back together. The handle can be lowered on the rod, allowing operation in a narrow ditch. In cutting pipe in the trench all the space that is required underneath the pipe is just enough to pass the links carrying the cutter wheels. In making ordinary repairs or inserting specials in a line of pipe, the work can be completed in less time than it takes to dig a hole large enough to use hammer and hardy. All cuts are clean and smooth without danger of breaking the pipe or disturbing the joints.

On cast iron pipe the wheels do not cut through, but when a groove has been cut around the pipe to a reasonable depth a little extra pressure on the screw and handle will cause the pipe to crack off. On a 12-inch water main this depth of cut will not exceed $\frac{1}{4}$ inch.



**THE ELLIS & FORD
PIPE CUTTER**

A Truck Hoist With a 2-Year Guarantee

Insurance Against Maintenance Costs and Protection Against Breakdowns Is Afforded Hoist Owners



**THE TYPE OF HYDRO HOIST WHICH
NOW HAS A 2-YEAR GUARANTEE**

OWNERS of truck hoists may now receive guarantees of satisfactory operation. The Heil Co., Milwaukee, Wis., is issuing a 2-year guarantee on every Hydro twin-cylinder hoist which goes out from its factory. Hoist owners are thereby insured against maintenance costs for two years and assured that the earning capacity of their trucks will not be curtailed by failure of the dumping unit.

Application for this guarantee must be made to the manufacturers by the owner of the hoist within ten days after the date of purchase. The hoist must be registered in this manner or the guarantee will not apply. The necessary application blank is attached to each hoist when it leaves the factory. Every guarantee is signed by Julius P. Heil, Vice-president. The guarantee reads in part:

"The hoist proper, including saddles, filler blocks and crosshead shaft, is guaranteed against breakage of any kind except that due to collision, fire, or act of God. The Heil Co. will replace any part or unit or the hoist itself which by inspection of The Heil Co. or its authorized representative shall prove to be defective or damaged."

The hoist is made for application on any make or model of motor truck from $1\frac{1}{2}$ to $7\frac{1}{2}$ tons capacity, and is powerful, compact and fast operating.

Bath-Tub Bodies for Wet Concrete

Larger Loads and Reduced Hauling Costs, Better Mix and Freedom from Sticking, Make This New Type Body Essential for Construction Work

IN order that heavy, wet material may be handled rapidly and profitably, with the minimum of adherence to the sides of the body and the maximum of loads, the Wood Hydraulic Hoist & Body Co., Detroit, Mich., has developed a half-round "Bath-tub" truck body. This special construction prevents the wet material from settling close to the steel and allows the body to clean itself quickly when the load is dumped. The body has extension sides, so that when a one-batch load is hauled the

bent to conform to the inside curvature of the body. This iron bar is fastened on the front side of the tailgate. When the tailgate closes, the round iron bar forms a "V" in the bottom of the body, into which the wet concrete is forced by pressure, making an absolutely tight joint.

With this semicircular bottom the wet mix is prevented from sticking, since an equal pressure is exerted downward and in from the curved sides. The front end of the body is also curved so that



**WOOD
BATH-TUB
BODY
WITH HORIZONTAL
HYDRAULIC
HOIST
MOUNTED ON HUG
TRUCK**

additional height of the sides prevents the wet mix from spilling while the truck is en route to the place where it is to be dumped.

This body is semicircular in cross-section and the sides are straight for a short distance above the concavity of the body. There is a rounded plate in the front end of the body, so that the entire inside surface is smooth, with no square corners. The tailgate is fitted with a round iron bar,

there are no sharp corners anywhere.

According to the manufacturers, results of experiments have proved that this type body not only permits larger loads with the attendant reduced hauling costs, but also places the concrete at the end of a relatively long haul in a very much better condition. This body has practically eliminated the objectionable segregation of the mix, within a reasonable hauling radius.

A Powder Bag for Carrying High Explosives

Economical, Safe and Practical Means of Transportation

A POWDER bag for the economical, safe and practical carrying of high explosives from storage to the working face of mines or other places has been developed by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. This is the outcome of experience that has shown the risk run by the use of untreated canvas bags and the ever present danger of the tearing or coming apart of bags when explosives are being carried up raises or otherwise handled in mines, quarries and construction work.

The material used in making these new bags is

a specially treated fabric which is waterproof and resistant to fungus, dry rot, acid waters, vitiated air and all similar underground conditions. It is also a non-conductor of electricity. It is the same material that is used in making du Pont Ventube for carrying fresh air to men working in mines and in subway and other underground construction.

Two types of bag are made—pouch and knapsack. The capacity of the bags varies from 50 to 125 sticks of dynamite. The bags are easily carried and are proving popular for high explosives.

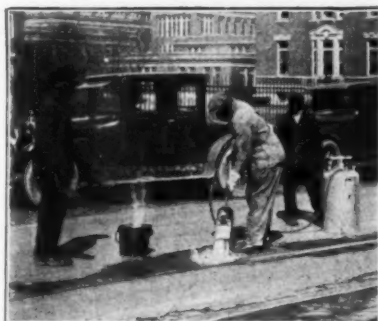
A New Portable Oil Burner

Wide Variety of Uses Makes This Unit a Valuable Piece of Equipment for Contractors

A NEW torch type portable oil burner unit has recently been placed on the market by Littleford Bros., 485 E. Pearl Street, Cincinnati, Ohio. It provides at a very low cost an intense heat, which is easily and quickly controlled and adjusted, and it can easily be moved from place to place.

These oil burners are used to dry holes in streets before patching them. They are also employed successfully for concrete heating in connection with winter construction work; heating mortar in cold weather; thawing frozen piles of sand, gravel, coal, coke, stone, etc.; heating asphalt in melting kettles; drying concrete tunnels and subways for waterproofing; thawing frozen ground before excavating; melting ice and snow off street manhole covers; thawing frozen hoppers of coal cars and frozen railroad switches, and many other operations.

Contractors and state highway departments are



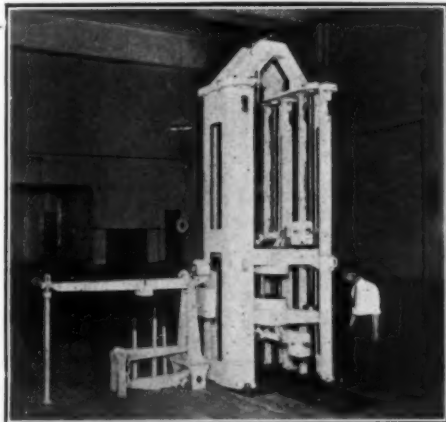
PORTABLE OIL BURNER FOR DRYING OUT STREET BEFORE PATCHING

finding these oil burner units necessary equipment for general and emergency use.

600,000-Pound Vertical Testing Machine Installed

Testing Laboratory Installs World's Largest Machine for Commercial Service

THE Pittsburgh Testing Laboratory, with executive offices and main laboratories at Stevenson and Locust Streets, Pittsburgh, Pa., has announced the installation at its Pittsburgh plant of a new universal 3-screw vertical type testing machine, with an ultimate or maximum capacity of 600,000 pounds. This is the largest uni-



THE PITTSBURGH LABORATORY'S NEW VERTICAL TESTING MACHINE

versal type testing machine owned and operated by any commercial physical testing laboratory in the United States or Canada. Some idea as to the size of this machine may be gained from the fact that the machine completely assembled weighs ap-

proximately 30 tons and measures 16 feet from the extreme top of the columns to the floor line or base of the machine, and it has a distance of 40 inches between the screws.

The top or fixed head of this machine has two positions. Raised to its upper position in the machine, it will be possible to crush or compress specimens 10 feet 6 inches long and conduct tensile or pulling tests on specimens 8 feet 6 inches long. The gripping jaws of the machine are designed to take flat bars in sizes up to $3\frac{1}{2}$ inches thick and 6 inches in width and round bars up to 5 inches in diameter. Another outstanding feature of this machine is the base for supporting the work under test. This platen measures 10 feet 6 inches in length, and is provided with two slots running the entire length. These slots permit the entrance of holding down bolts for clamping the specimen under test to the base or platen of the machine.

The machine will provide ample capacity for determining the ultimate crushing strength of massive reinforced concrete specimens in the form of piers or beams as well as tile and brick piers and fabricated steel structural specimens, and will also be capable of determining the end compressive strength of tubing in the largest sizes. It will also be possible to determine the tensile strength of long steel bars, welded specimens, and to determine the strength of the largest diameters of wrought iron and steel shapes as rolled. It will also be possible to determine the breaking strength of the largest size chains and cables as well as links used for hoisting purposes, as well as innumerable other materials requiring excessive loads to rupture or compress to failure in experimental tests and investigations.

A New Stump Pulling Device

Giant Nutcracker is Operated by Crane

AN improved stump pulling machine has been developed and arrangements are being made to put the device on the market on a rental basis by the inventor, Chris Wester of Boone & Wester, Contractors, Cedar Key, Florida.

The clearing and grubbing on Florida State Road Project 677-C, Road Number 13, in Levy County, was recently performed in record time by the use of several gasoline dragline machines equipped with these devices for pulling the stumps and for piling the stumps and logs preparatory to being burned when dried. The location of the work in Levy County is through what is probably the heaviest cleaning and grubbing to be en-

plosives, thus speeding the pulling operation, as well as aiding in the burning of the stumps at a later date.

Speed and getting away from old and expensive hand methods is the keynote of the new invention. The puller itself is automatic and needs only the operator on the dragline machine to place the puller on the stump, pull it out, swing the boom and deposit the stump in the pile along the right of way. No hand work is required to fasten the puller to the stump nor to release the stump from the puller when in a position to drop.

Among the unique qualities of the machine is the arrangement of the cables so that the harder



**NEW
WESTER
NUTCRACKER
STUMP PULLER IN
OPERATION**

countered anywhere within the borders of Florida. The road runs through swampland known as "Gulf Hammock," being covered with a dense growth of large timber and underwater during the rainy season.

The stump puller itself, which weighs about 1,600 pounds, is made from two pieces of 6 x 6-inch iron hinged at one end so as to open and close like a giant nutcracker. The power for pulling the stumps was supplied by several P & H cranes, the nutcracker itself being swung from the point of the boom by the hoisting cable, while the stump is pulled by the dragline cable. The larger size stumps are loosened or split by the use of ex-

the pull on the cable the tighter the grip of the puller on the stump.

When stump pulling is being done preparatory to grading a road, there is another feature of considerable value, notably that the roots of the trees are pulled out of the ground removing these obstructions to the grading operations as well as taking out this perishable matter from the foundation of the road. By using the nutcracker from 2 to 5 acres of stumps can be pulled per day, depending upon the character of the ground to be encountered and the number of stumps to be taken out, making this a popular device with contractors with similar land to be cleared.

*Conservatively estimated, seven out of ten accidents
in construction are preventable by educational means.*

Proportioning Concrete Aggregates by Weight

Accurate Measurement Combined With Simplicity of Operation

WEIGHING hoppers that combine accurate measurement of aggregates with simplicity of operation are being manufactured by the Butler Bin Co., Waukesha, Wis. They may be arranged to operate in three different ways: sand and coarse aggregate may be weighed separately in individual receiving hoppers, each suspended from its own scale, Type G; both aggregates may be weighed separately in individual compartments of a receiving hopper suspended from a single scale, Type H, and the sand may be weighed in a Type G weighing hopper and the coarse aggregate measure by volume in a Type C measuring hopper.

All of the three methods are simple and may be operated by an ordinary laborer. The weight of the sand (dry) and the weight of the water in the sand may be quickly determined by a simple test. In weighing off any given batch, the weight of the water is added to the weight of dry sand desired so that each batch weighed off represents a definite value in dry sand.

The weighing hopper arranged for weighing sand and stone, each in a separate unit, consists of a five-point suspension scale, receiving hopper and discharge door, together with control gate located under the bottom of the storage bin to regulate the flow of the material into the hopper. The scale is equipped with a horizontal extension lever projecting out to the side of the bin so as to bring the scale operating parts and filling gate operating levers convenient to an operator on the ground. Cables for operating the hopper discharge door are also located within easy reach. When operation from a platform under the bin is desired, the filling gate is controlled by a rack and pinion and the location of scale weights or dial is changed to suit.

In order to provide against overweighing the volume of the receiving hopper is made adjustable and can be set so that for any given weight there is not sufficient volume in the receiving hopper to permit overweighing. The hopper is also equipped with a draw-off spout and gate, easily controlled from the operator's position, so that in case of carelessness any slight excess can be easily drawn off.



BUTLER WEIGHING HOPPERS DISCHARGING INTO INDUSTRIAL RAILWAY BATCH CARS ON LARGE ROAD CONTRACT

The weight in the hopper is determined by removable weights on the end of the vertical weight rod; one pound of weight representing 100 pounds in the hopper. The scale is equipped with hardened knife edges and the whole weighing device is so substantially built as to give long years of service with practically no attention.

When desired, the weighing hopper may be equipped with a dial for weighing any portion of the last 300 pounds. The use of a dial speeds up the filling operation slightly, since the control gate can be gradually closed as the dial pointer moves around to the desired weight.

All points of the scale fasten to the filling gate frame so that each outfit is shipped practically assembled, making it very easy to erect in the field. This Type G hopper is easily converted into a measuring hopper by inserting the top section of a measuring hopper, making an interchangeable unit.

Someone has said that an accident is the spectacular indication of inefficiency

A Double-Drum Hoist Used in Unusual Service

Complete Installation Costs Contractor Only \$1,300

A DOUBLE-DRUM Porta-hoist, made by Pioneer Tractors, Inc., Winona, Minn., is performing an interesting and unusual service in unloading gravel from railroad cars for C. H. Vickerman, contractor, of Caledonia, Minn. With this hoist, Mr. Vickerman is unloading gravel efficiently, quickly and cheaply in what he believes

the car. The cables from the drums run through these sheave blocks and attach to a pair of slip scrapers of a special design. These unload the gravel from the car, dumping it onto the chute, which delivers it into the truck body.

The cost of the entire installation to the contractor was approximately \$1,300, which he says



**PORTA-HOIST
UNLOADING GRAVEL
FROM
RAILROAD
CARS**

is record time.

The outfit consists of a double-drum hoist with special drum lagging to make the speed of both drums equal and special driving sprockets to reduce the cable speed to approximately 90 feet per minute on both drums. In addition to the hoist there is a tripod carrying two sheave blocks attached to

is much less than the cost by any other method. He unloads 60-ton cars at the average rate of a little better than one per hour, his best time being thirty-eight minutes for unloading a car containing 38 yards. A 1½-yard truck is loaded from the time it stops under the delivery chute until it drives away in an average time of fifty-five seconds.

A Rapid Self Loader for Contractors

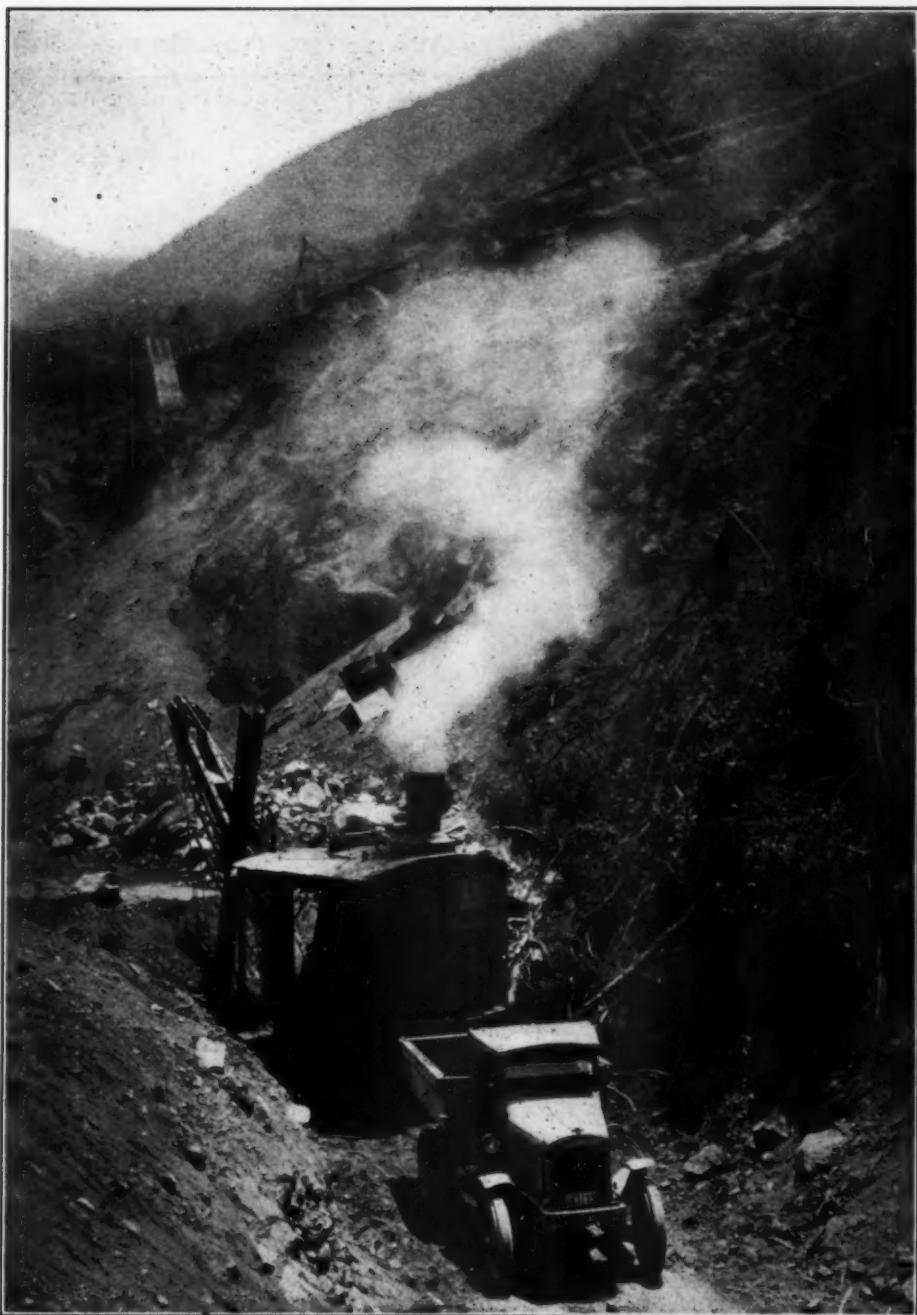
Hauling Expense Cut in Two by Attachment That Does the Work of 6 to 8 Men

FOR loading loose materials as sand, gravel, crushed rock, etc., contractors will find the Arps self loader for Ford trucks, which is being manufactured by the F-S Manufacturing Co., Inc., New Holstein, Wis., economical and rapid.

According to the manufacturers, this combination with dump body and Jumbo or Warford transmission with over-drive and power take-off will do the work of 6 to 8 men at a minimum cost. It is light and durable, being built of the best materials, and is very simple to operate. The shovel is backed into the material, the power take-off lever is shifted

—the reverse lever is pressed and the shovel comes up, dropping the material into the body. Then the low speed lever is pressed and the shovel goes down for another load.

The heat treated gears are run in oil. The scoops are made of 3/16-inch high carbon steel. The winch spools are visible, and the entire loading equipment can be removed in five minutes when the truck is desired for other purposes. The thin plow steel pressed scoops are easily backed into the material. The attachment is made in five different sizes to suit the purpose for which it is intended.



ONE OF A FLEET OF 3-TON INTERNATIONAL HARVESTER MOTOR TRUCKS OWNED BY THE MAY-HUGH TRUCKING CO., LOS ANGELES, CALIF., SERVING AN ERIE STEAM SHOVEL ON THE SAW PIT DAM PROJECT NEAR MONROVIA, CALIF.

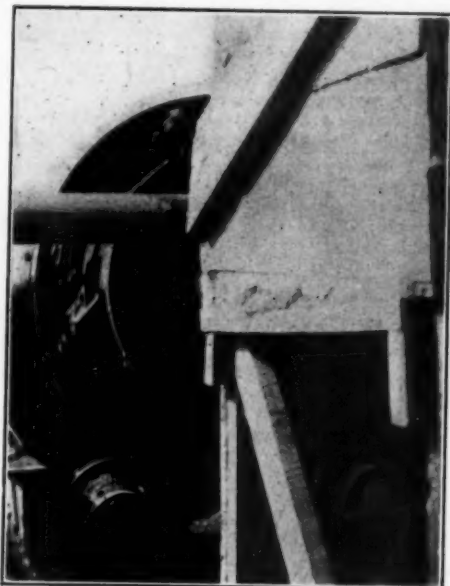
A Gravel Washer with a New Scrubbing Device

Grinding Action of Big Rock Eliminates Clay and Other Extraneous Matter

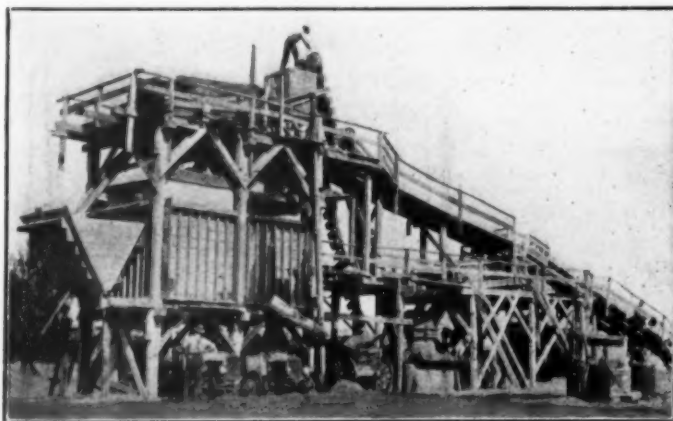
A NEW gravel washing device, which operates on the ball-mill principle, has been developed by the Smith Engineering Works, Milwaukee, Wis. It is the Telsmith-Ajax washer, in which the grinding action of the big rock is the new washing agency. In it, extraneous matter not soluble in water, particularly clay, is pounded into a paste and washed out.

The scrubber is divided into several compartments by retainer rings. These rings, which are considerably deeper than any baffle plate heretofore used, do not seriously impede the flow of small aggregate, but they retard the progress of the large rock. The sand tends to blanket the grinding action of the coarse aggregate. The scrubber is therefore perforated, generally with $\frac{3}{16}$ - or $\frac{1}{4}$ -inch holes and the sand is flushed out rapidly so that the full grinding value of the big pebbles may be utilized. The scrubber is thus converted into a ball mill, the large boulders pounding and grinding the clay balls into a paste, which is soon washed out.

An important feature of this washer is the two-section jacket. The scrubber is surrounded by a sand jacket, generally perforated with $\frac{3}{16}$ - or $\frac{1}{4}$ -inch holes. The jacket is followed by another of the same diameter, enclosing the first stone screen. The first jacket passes the sand, while the second jacket is generally perforated to remove the smaller rock, $\frac{1}{2}$ -, $\frac{3}{4}$ - or 1-inch size. Only a



CLOSEUP OF THE FEED END OF THE TELSMITH GRAVEL WASHER



**GRAVEL
WASHING PLANT
OF THE
ROGERS CONSTRUCTION
CO.,
HONOR, MICHIGAN,
SHOWING
TELSMITH CHAIN
ELEVATOR**

small volume of rock is carried on the smaller perforations in the jacket and accurate classification is obtained.

The washer is of all-metal construction. The supporting frame is made of I-beams, simple in design, with a minimum of riveting and a maximum of rigidity. The washer may be put in place without springing the frame or distorting the operating mechanism. Once placed, no adjustments are necessary to take care of swelling, softening or

warping of wood timbers. The alignment is permanent, assuring long life of shafts, bearings and gears.

The headring and rollers are of high carbon steel. The angle frame is rigid and substantial. The scrubbing and screening plates are of heavy gage. The gears are adjustable to maintain proper mesh and all bearings are carefully protected against water and sand, thereby assuring greater efficiency.

A Convertible Gasoline or Electric Power Hoist

Built for Enduring Service with Ample Strength and Durability for Strenuous Duty

CORRECT design, careful selection of the best materials and high quality of workmanship combine in making the Type "20LG," convertible gasoline or electric power hoist of the Dake Engine Co., Grand Haven, Mich., a simple hoisting machine of rugged construction, well balanced and smooth running, and with every convenience for easy operation.

The convertibility of this hoist is one of its outstanding features. In addition to being able to convert the single drum hoist to double drum

tors are of the enclosed type, series wound, protected from dust and moisture. The drum type controllers are operated by a single handle.

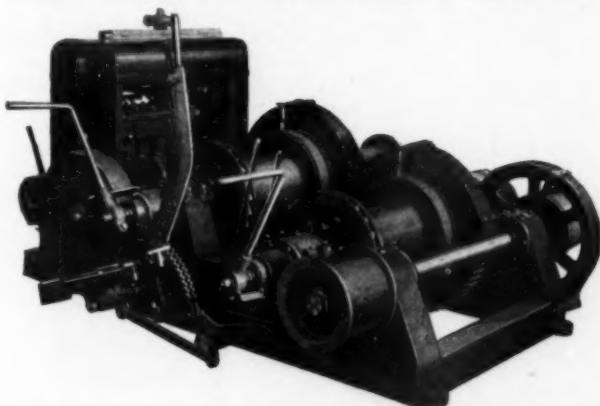
The gasoline engine is mounted on the hoist so that the valves, carburetor, magneto, governor, and water pump are all accessible from the rear end of the hoist. All hoist operating levers are located within easy reach from the operator's position.

Alemite high pressure lubrication is used on all bearings. An Alemite compressor, or grease gun

with fittings is furnished as part of the standard equipment.

The slewing attachment for bullwheel derricks is simple, strong, compact and efficient. It operates independently of the drums and has a single lever control.

The base frames or bed plates of this unit are of one-piece unit construction. The side stands are cast solid to the base. This insures greater strength and rigidity as well as the alignment of the intermediate shaft and drum shaft bearings. The gasoline engine or the electric motor is mounted on the single drum hoist base unit so that the hoist is self-contained. The single drum base frame is machined and drilled so that



THE NEW DAKE DOUBLE DRUM GASOLINE HOIST WITH BOOM SWINGER AS SEEN FROM THE OPERATOR'S SIDE

and vice versa, the base plate is arranged so that either a standard hoist-duty motor or a gasoline engine may be used. Thus the purchaser of a gasoline-driven hoist may change to electric drive if desired, by the purchase of the motor and driving pinion, and replacing the gasoline engine with electric motor, no machine work being required for making the change. In this way, the owner saves the purchase of an extra hoist and with minimum expense may use the same hoist with the power most suitable for any job.

All hoist parts are made in jigs and fixtures on the duplicate part system, and are rigidly inspected, guaranteeing interchangeable parts for all repairs.

The Continental Red Seal Industrial power unit, Model P-20, is used for gasoline operation. The engines are equipped with radiator, vertical tube gravity feed carburetor, air cleaner, high tension impulse magneto and switch, force feed lubrication with oil gage and indicator, spark plugs, gasoline tank, housing and muffler, also close regulating automatic governor for speed control. For electric power, standard types of motors developed for hoisting duty are furnished. The horsepower ratings are based on one-half hour continuous work with 55 degrees centigrade rise in temperature. Alternating current motors are of the slip ring, variable speed, induction type. Direct current mo-

the base frame unit for the second drum can be attached and bolted solid to it. The second drum base frame unit is also machined and drilled for attaching the boom swinger unit. The holes for bolting the units together are drilled under the interchangeable parts system of this company.

The drum shafts and intermediate shaft are equipped with Timken tapered roller bearings. The drums are of the friction type and made of cast iron with extra large phosphor bronze bushings.

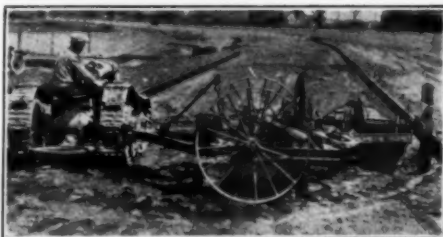
All frictions are lined with the best quality, non-burn asbestos put on the drum in sections and arranged so that they can readily be replaced when worn, without removing the drum shaft from its bearings. The friction is engaged by means of a forged steel lever, or handle, an accurately machined steel friction screw and nut, and two carbon tool steel thrust pins. The pins are inclosed in an oil chamber filled with soft lubricating grease to eliminate all possible end friction. One of the thrust pins is connected by cross key to the drum. The other is fitted to the friction screw. Both pins are made with turned heads which are hardened to prevent wear. A yoke fitting over the heads of the two pins provides a positive mechanical release of the frictions as the backing-up of the friction screw pulls the frictions out of contact if there should be any tendency to stick.

A New Short Turn Tractor Hitch

Attached to Any Tractor-Drawn Equipment, It Takes the "Tug" Out of Turning

A CONSIDERABLE saving of time and fuel and an ease in turning are the features of "E-Z-Turn" tractor hitch manufactured by The E-Z-Turn Tractor Hitch Co., Bay City, Mich., for all tractor-drawn implements. This hitch is entirely automatic, and can be operated easily by any boy. It makes the turn in 3 feet, and there is no waste in time or fuel, since it turns quickly and easily, thereby saving power, fuel and operator's energy. There is no bumping of fences or breaking out new lands when this hitch is attached to an implement.

The 35-inch stationary drawbar eliminates the side draft caused by turning and stops all skidding under even the most adverse soil conditions. The implement at all times is under control of the operator, making it handle and steer easily and efficiently. It works very close to fences and ditches and permits a turn to be made with about the same power as the straight ahead pull. No power is wasted by the crowding of the outer side of the



THE "E-Z-TURN" TRACTOR HITCH WITH FORDSON TRACTOR SHOWING THE FACILITY WITH WHICH THEY TURN AROUND IN RESTRICTED AREAS

front wheels of the tractor against the ground while turning. It saves time, fuel, power, wear and, by reason of shorter turns, miles of tractor travel in one field alone. The implement is at all times the same distance from the tractor, a necessity with some tools.



"E-Z-TURN"
TRACTOR HITCH
WITH STATIONARY
DRAWBAR

Blasting to Settle Fill in Swamps

A METHOD of settling fill in swamps by blasting which saves the expense, danger and delay which usually goes with grading through peat and muck, has been devised by Minnesota Highway engineers, according to a bulletin from that Department.

On one project near New Brighton, Minn., which has been under construction this last summer, there were several short fills across swamps in which soundings showed that the solid bottom was from 5 to 30 feet below the surface. A grade built on top of this surface would be subject to settlement for several years.

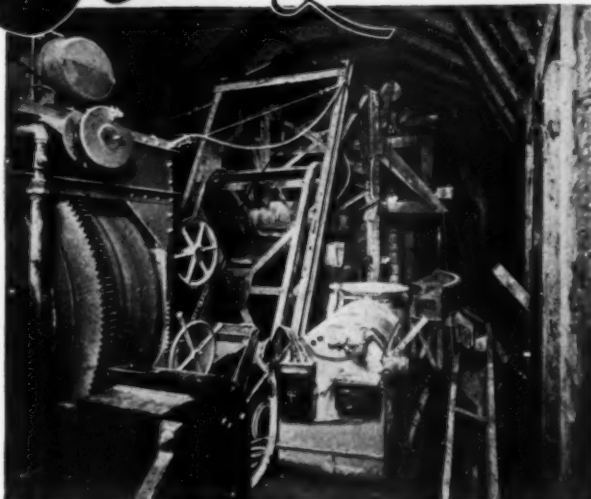
A dump was started out over the swamp and built from one to 6 feet higher than required by the plans. Then holes were bored through this solid material 30 feet apart and each hole loaded

with from 50 to 150 pounds of 40 per cent gelatin and 4 or 5 holes shot in a string. The blast pushed the soft material sideways and the solid material dropped down on the solid bottom.

At other places, where soil conditions permitted, the blasting was done before any solid material had been placed on the grade. Holes were poked in the peat 3 feet deep and one foot apart along the center line, two sticks of dynamite placed in each hole and a long string blasted at one time. This made a trench 5 or 6 feet deep and 20 feet wide.

Besides being cheaper than having to send a grading outfit to raise sinkholes perhaps several times over a period of years, there is every indication that the fills made by this method are solid enough to carry concrete at once.

14 Ransome Pneumatic Placers for A. Guthrie & Co.



Ransome Horizontal
Pneumatic shooting
concrete into the
Cascade Tunnel

In the May, 1927 issue of the CONTRACTORS AND ENGINEERS MONTHLY, we used the heading "Nine Ransome Pneumatic Placers for New York Subway Work." We thought this was a pretty good showing, although the nine placers were divided among several contractors.

Now one concern, A. Guthrie & Co., Inc., of St. Paul have contracted with us for 14 placers. Six are already at work on the Cascade Tunnel of the Great Northern Railway, Scenic, Wash., and three on the Illinois Central Tunnel, Ozark, Illinois. Five more are to be shipped to the Cascade Tunnel early in 1928.

If you have a tunnel to line, or any similar work, give us the answers to the questions below:

- | | |
|--|---|
| 1. Length of tunnel, end to end. | 11. Length of form used, steel or wood, and print of same |
| 2. Length between shafts. | 12. Type of concrete cars. Height and width. |
| 3. Height and width in rough. | 13. Locomotive (if used). Height and width. |
| 4. Height and width, finished section. | 14. Size and kind of gravel or stone used. |
| 5. Minimum thickness of concrete and point at which it is found. | 15. Compressed air available in cubic feet per minute. |
| 6. Amount and location of reinforcing. | 16. Will drills, air hammers, etc., operate from this supply when blowing concrete? |
| 7. Is tunnel in rock or earth? | 17. Gauge and size of track used. |
| 8. Will tunnel excavation be completed before lining? | 18. Electric current available for operating motor. |
| 9. If mucking, while lining, must muck cars pass through furns? | 19. How much yardage to be placed by air is involved? |
| 10. If in soft ground, will concreting follow up behind heading? | 20. Make sketch showing measurements mentioned in 3, 4, 5 and 6. |

Name of Contractor or Engineer

Address

Location of Job

Ransome Concrete Machinery Company
1850 — Service for 77 Years — 1927
Dunellen **New Jersey**

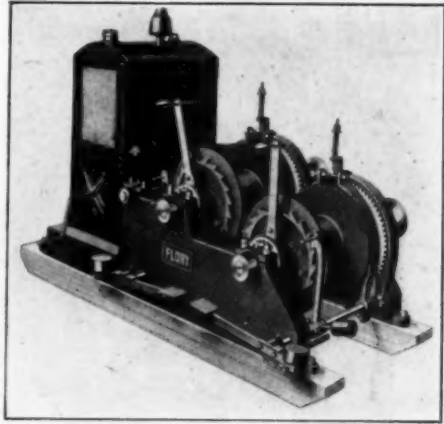
Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.

A Light-Weight, Powerful, Small Hoist

Compact Hoist Designed for Light-Duty Hoisting Operations

THE S. Flory Manufacturing Co., Bangor, Pa., has recently brought out the Flory "Cub," a light-weight, compact and powerful small hoist designed for light-duty hoisting operations. The hoist has a capacity of 1,500 pounds single line pull at a drum speed of 125 feet per minute. It is made with a solid cast iron base upon which is mounted a 2-cylinder 8- to 10-horsepower gasoline power unit. The engine is radiator-cooled and drives the gearing through sprockets and chain, which are enclosed in a sheet steel casing.

All gears in this hoist have machine-cut teeth. The friction clutch is equipped with a molded asbestos cone and the brake is of the two-piece band type lined with non-burning material. The band is suspended from the bracket with a spring so that it is always held free when not in use. The hoist is also equipped with a winch head and ratchet and paul. The weight of the complete single-drum outfit mounted on skids is 1,250 pounds, while the double-drum outfit mounted in the same manner weighs 1,700 pounds.



THE FLORY "CUB" DOUBLE-DRUM HOIST

A New Industrial Tractor

Low, Compact Machine Will Turn in 10-Foot Radius

FOR use in road building and maintenance work, parks and other places where reliable and dependable mechanical power is demanded, the J. I. Case Threshing Machine Co., Racine, Wis., has placed on the market a new industrial tractor. The machine has been built compact and low so that it can operate in close quarters. It can go through gates and doorways, up ramps, on elevators and in many tight places where tractors are often unable to operate. It has great stability because of its low center of gravity. It works on steep slopes and can go under low overhanging obstructions since there are no parts projecting up over the tractor.

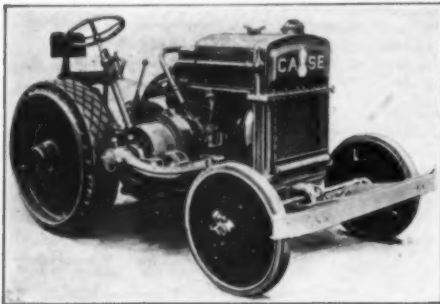
The tractor will turn completely in a radius of only 10 feet, enabling it to work in cramped quarters if necessary. This saves a great deal of time

in that the tractor can be driven through crowded passages with its load. The construction of the tractor is simple and it can be operated by anyone with ordinary ability. All necessary controls are within easy reach of the driver. The steering gear moves the front wheels quickly without allowing them to jerk out of control.

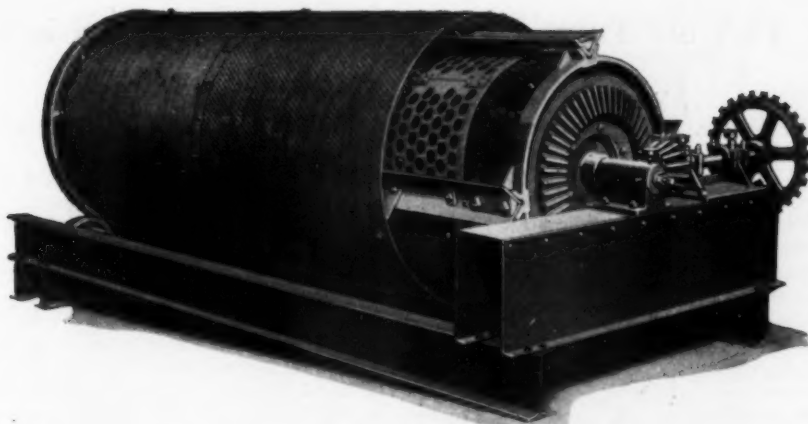
The new Industrial is rated at 12 horsepower on the drawbar and 20 horsepower on the belt, with an abundance of surplus power for emergencies. Equipped as it is with a belt pulley, it is always ready for a belt job as well as a drawbar task. A quick-acting, throttling governor regulates the speed of the engine quickly to meet any variations in the load.

Because of the fact that so much of the work of this tractor is on floors of buildings, platforms, decks, docks, ramps and pavements, this tractor obtains the traction by weight on the rubber-tired wheels. They have good traction on slippery or loose surfaces. The weight of the tractor is so divided that approximately two-thirds of it is borne by the rear wheels. These are cast hollow so that if needed in very hard going they can be filled with 400 to 500 pounds of sand for additional traction. A comfortable spring mounted seat with back rest takes up the road shocks and affords comfort for the driver.

All necessary controls are within easy reach of the driver. The steering gear moves the front wheels quickly without allowing them to jerk out of control. From the seat the driver commands a good view all around himself as well as straight ahead.



NEW INDUSTRIAL TRACTOR WITH 10-FOOT TURNING RADIUS



Washes Out the Clay

new washing agency solves old problem

Successfully

The entirely new washing agency employed in the Telsmith-Ajax Washer (all-metal construction) makes it a better scrubbing device than either the conical or cylindrical washers. Washing out the clay has always been a difficult problem. In the ordinary rotary washer the sticky clay gathers up sand and rock particles; and continued rotation produces hard, compact balls. **Operating on the ball mill principle**, the Ajax Washer utilizes the big rocks to grind and pound the clay balls into a paste which soon washes out.

Another big Ajax feature is its tandem sand jacket. One jacket—

perforated with 3/16- or 1/4-in. holes, and surrounding the scrubber—passes the sand. The second jacket, of the same diameter, enclosing the first stone screen, removes 1/2, 3/8, 3/4 or inch size rock. By locating these smaller perforations outside the main screening barrel, the small rock is prevented from carrying over—insuring more accurate classification.

Bulletin A. W. 21 will enable you to better visualize the details of the Telsmith-Ajax design and its substantial **all-metal** construction. Mailed without cost or obligation.

Write for it today

SMITH ENGINEERING WORKS

1820 Holton Street, Milwaukee, Wis.

A. W. 2.

11 West 42nd St.,
New York City

Canadian Representative: Canadian Ingersoll-Rand Co., Montreal, P. Q.

Old Colony Bldg.,
Chicago, Ill.

80 Federal St.,
Boston, Mass.

Beckwith Mch. Co.,
Pittsburgh, Pa.

Tower Mch. Co.,
Cleveland, O.

Milburn Mch. Co.,
Columbus, O.

Knox Eq. & Eng. Co.,
Indianapolis, Ind.

Brandeis Mch. & Sup. Co.,
Louisville, Ky.

G. H. Mueller Co.,
Birmingham, Ala.

TELSMITH-AJAX

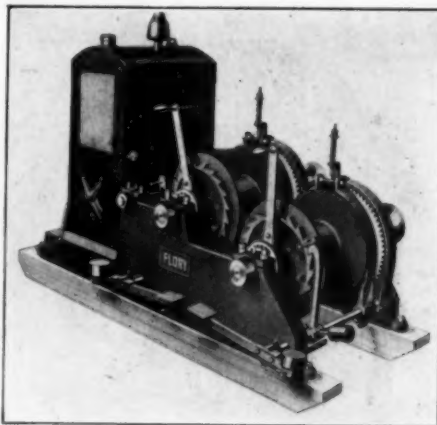
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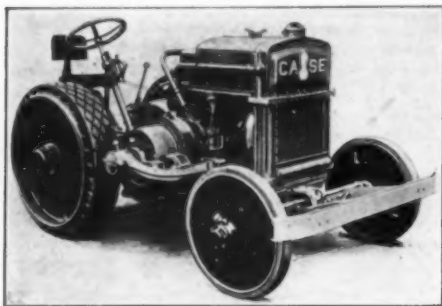
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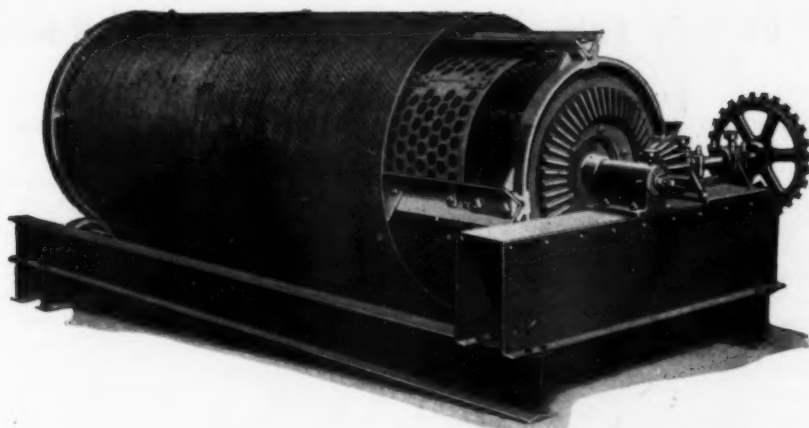
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Successfully

The entirely new washing agency employed in the Telsmith-Ajax Washer (all-metal construction) makes it a better scrubbing device than either the conical or cylindrical washers. Washing out the clay has always been a difficult problem. In the ordinary rotary washer the sticky clay gathers up sand and rock particles; and continued rotation produces hard, compact balls. Operating on the ball mill principle, the Ajax Washer utilizes the big rocks to grind and pound the clay balls into a paste which soon washes out.

Another big Ajax feature is its tandem sand jacket. One jacket—

perforated with 3/16- or 1/4-in. holes, and surrounding the scrubber—passes the sand. The second jacket, of the same diameter, enclosing the first stone screen, removes 1/2, 3/8, 3/4 or inch size rock. By locating these smaller perforations outside the main screening barrel, the small rock is prevented from carrying over—insuring more accurate classification.

Bulletin A. W. 21 will enable you to better visualize the details of the Telsmith-Ajax design and its substantial all-metal construction. Mailed without cost or obligation.

Write for it today

SMITH ENGINEERING WORKS

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TELSMITH-AJAX

Yes—we would like you to mention the CONTRACTORS AND ENGINEERS MONTHLY.

Flexible Tubing Carries Fresh Air to Men in Subway Tunnels

Powder Fumes, Dust and Carbon Monoxide Gas Cleared, and Work is Continuous

AN innovation in subway construction work of the New York subways is the use of Du Pont Ventube flexible tubing for providing auxiliary ventilation at the working faces. It is believed to be the first time that flexible tubing has been used in such work and the three contractors who are using it have employed in all 3,500 feet.

Originally, these contractors had begun to drill tunnels without the aid of auxiliary ventilation and as a result they lost a large amount

of carbon monoxide gas developed from the exhaust of many trucks that are used in the underground operations, and the men who are digging the tunnels are assured fresh air.

The blower and tubing are located outside the portal of the subway tunnel when possible and the fresh air is picked up and sent through the tunnel. In one cross-tunnel, where conditions made it impossible to place the blower outside, it was located in the tunnel, above the roadway. It then sucks fresh air through a



SUPPLYING FRESH AIR TO SUBWAY CONSTRUCTION WORK IN NEW YORK CITY

Left—Muck being hauled through cross tunnel from main tunnel. Notice blower and Ventube located outside portal where it picks up the fresh air. Center—View showing large cross section of the main tunnel with the working face 350 feet in the distance. The line supplying the fresh air is seen at the right. Right—Method of splitting a line of Ventube to properly ventilate two headings, showing the extreme flexibility of Ventube

of time waiting for smoke and dust to clear after the blast. In one instance there was approximately a forty-five minute wait after each shot before the men could return to work. After the flexible tubing was installed there was practically no delay and the engineers estimated that the use of this tubing had enabled them to speed up progress twenty-five per cent.

The tubing is used principally to clear powder fumes and dust after blasting in order that the men might return to work promptly. It also acts as a safety measure in clearing car-

metal tube and Ventube relays it to the face 600 feet away. The tubing is attached to the side or hung from the top of the cut according to the conditions of the tunnel.

The tubing is extremely flexible; it can be split to properly ventilate two headings and will follow the bends in the tunnel without impairing its air delivery. At the terminus of the tubing, fresh air is brought through to the men at the working face, and there is no delay in the working operations and no danger of poisonous gases reaching the men on the job.

Minnesota Receiving Bids for 1928 Road Jobs

THE Minnesota Highway Department, following its policy of planning work far in advance, is receiving bids for work to be done in the summer of 1928. C. M. Babcock, Commissioner, received bids on November 1 on 25½ miles of paving and 79 miles of new grading to be done in 1928. By letting contracts in the fall, the Department gets better prices, the contractors are able to get ready and start early in the spring.

The list includes one grading job 27.6 miles long which will involve moving 741,000 cubic yards of dirt. Six other jobs in various parts of the state contemplate moving a total of approximately a million yards more.

The paving advertised will complete the gap from the present pavement south of Shakopee to Minneapolis on State Road No. 5 and over State Road No. 52 from No. 5 to St. Paul.

Waukesha Engine Power Shovel in Chicago

n-740-M

(From an Editorial in Oil Engine Power)

Breaking the Steam- Habit

"HABIT is a powerful servant, but a dangerous guide—HABIT enslaves the intellect, hog-ties facts and clogs initiative—HABIT, the blind drudge of inertia and half-truth, is cracking the whip of antiquated precedent over the power plants where steam is worshipped as a fetish and a cure-all.

"The STEAM HABIT is a capricious mistress, and while men know her weaknesses and her strength, her foibles and her limitations, they still take the line of least resistance, and pledge allegiance to steam rather than investigate new developments which THEY happen to know little or nothing about.

"An embarrassing thought for the progressive power executive—is he a slave of the steam habit?"

Until recently contractors and shovel engineers in Chicago have been hog-tied to steam-shovels, but the last year has seen a decided change; progressive contractors are learning from pocket-book experience that gas power shovels are here to stay. Waukesha Engines are used in more power shovels than any other make. There must also be a reason why they are chosen by builders like Erie, Link-Belt, P & H, Thew and Universal, who are very jealous of their reputation. Write for our "Shovel Engine" Bulletins and find out.

N-789-M

INDUSTRIAL EQUIPMENT DIVISION

WAUKESHA MOTOR COMPANY

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C. A. Watts

Exclusive Builders of Heavy Duty Gasoline Engines for Over Twenty Years

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A Crane That Speeds Up the Work and Cuts Down the Cost

It is Especially Designed for Handling Bulk Material, Laying Rails, and Operating Equipment

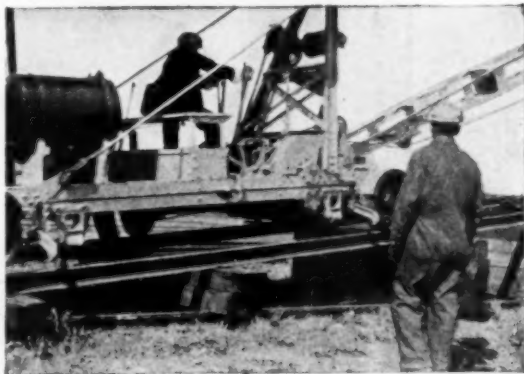
STRENGTH, dependability and safety as well as many important refinements of construction are the features of the crane manufactured by The Parsons Co., Newton, Ia. It operates with a maximum of safety and low cost. It handles all kinds of building material, rails, ties, double crossings, bridge girders, coal, ice, ballast and scrap, and also operates pneumatic and electric tools.

The boom extension of 26 to 35 feet which provides for loading and unloading gondola cars, the ballast box which allows the operator to adjust counterweight to suit the loads he is handling, the disc clutch control and the convenience of all operating levers, should prove of great interest to all contractors and industrial engineers. For handling loose material, the crane can be equipped with a $\frac{1}{4}$ -yard double-line clamshell. For handling scrap, it can be equipped with an electric generator and a magnet. In addition to the magnet, electric saws, drills, bolt wrenches, etc., can be operated from the generator. The crane can also be equipped with a compressor for the operation of pneumatic tools and hoisting apparatus. Ample power is provided for tampers, drills, hammers and riveters. When laying rails, the crane can haul the entire working gang, with ties and other material, to and from the bunk cars.

When specified, a light portable turntable can be supplied with this crane. When mounted on any flat car, this turntable enables the crane to load thrown-out rail into two gondolas, which makes a substantial reduction in the normal cost of picking up rail.

The use of heat-treated electric steel throughout the crane assures its great strength. Steel containers and side racks are provided for ballast so that the operator can fix the amount of counterweight in proportion to the loads he is handling. In addition to this counterweight provision, the crane has four rail dogs or clamps which are controlled from the operator's seat and may be dropped instantly when it is necessary to swing extra heavy loads through wide angles. As a still further safeguard against overturning or racking the machine, the crane has two other clamps, called outrigger clamps, one on each side of the machine. These clamps grip the rail on both sides and are tightened with a driven key which holds the machine firmly to the rails. They are particularly useful where the machine is doing clamshell work and should be kept rigidly in one place.

Working on a 15-foot radius with outrigger and double hoist-line, the crane has a capacity of 5,000 pounds, with ample reserve for overload.



LOADING A PARSONS CRANE IS EASY—TWO RAILS, A FEW TIES AND IT RUNS UP ONTO A FLAT CAR

The diameter of cable drums has been figured for maximum operating strength, with long cable life. The use of special flattened strand, extra-flexible cable permits a smaller drum diameter than would otherwise be possible, and thus gives greater load-hauling power.

The boom swings by worm and worm-gear. This gives the operator perfect control over his boom at all times, a particular advantage on curves, where super-elevation of one rail naturally tends to throw the boom on one side. This protects the gang from being hit with a swinging rail, and simplifies the control system. The boom swings by power through an arc of 180 degrees, 90 degrees on each side of the track center.

The use of Twin-Disc clutches for controlling power transmission gives the operator close control of the crane, prevents jerks and the consequent strains on the machine, and makes the crane easy to operate, particularly when heeling-in rail. The clutches are also mounted on the jack-shaft, which propels the crane forward or back at any of the three transmission speeds. Ample power with reserve for all operations of the crane, whether working or traveling, is provided by the 40-horsepower engine. All parts of the machine may be operated at any one of the three transmission speeds.

The traveling speed of 2 to 22 miles per hour in either direction permits the operator to make fast runs for passing tracks in clearing for traffic. In case of emergency, or where passing tracks are 8 or 10 miles apart, the crane may be removed quickly from the track to a set-off station or any road crossing. The operation is simple, and two men with pinch bars can shove it over onto the set-off station.

Join up for '28—

Highway officials who used Barrett materials and service in 1927 will tell you that:

Barrett field men render efficient and unobtrusive assistance in planning and carrying out road building programs.

Tarvia deliveries are made by Barrett—where, when and as wanted.

Tarvia is applied from Barrett equipment by specially trained Barrett men—the whole operation supervised by expert Barrett field men.

In brief—The Barrett Company sells more than road building materials—it sells *results*.

We'd like to work with you in '28. Let's talk it over. A post-card will bring the Tarvia field man.

Tarvia
For Road Construction
Repair and Maintenance



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Pneumatic Concrete Placers

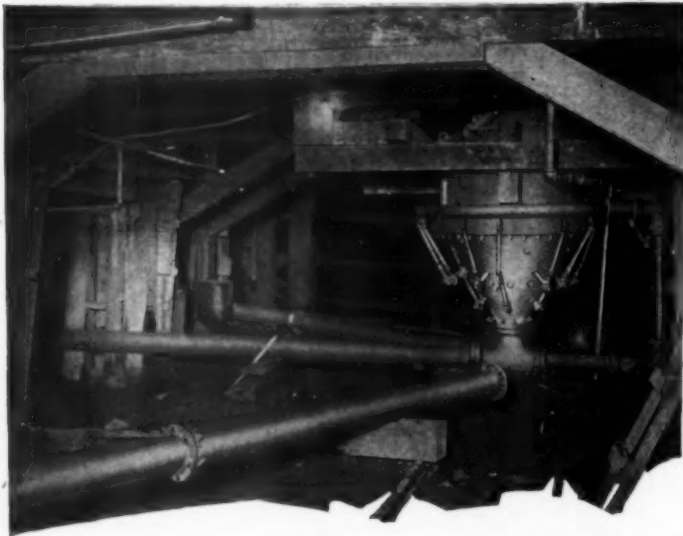
Latest Developments and Economies in This New Method of Construction

THE latest improvements in the new method of placing concrete by compressed air are embodied in the concrete placers and grout mixers and placers of the Ransome Concrete Machinery Co., Dunellen, N. J., which have been very successful in the various uses to which this type of concrete placing has been put.

Complying with the McMichael discovery that a jet of compressed air, properly placed and arranged, and shot into a mass of concrete at the restricted outlet, would kick it out in slugs, sections, or successive portions of the mass and shoot it wherever desired on a job, the Ransome horizontal type placers use a worm conveyor to move the concrete toward the outlet, where the air behind the mass presses it into the outlet neck, and the jet boosts it into and along the discharge con-

duit. impossible to secure a dense concrete in the closing or key section with the old method, with the pneumatic method a concrete is obtained which has more strength at the end of a 28-day test than concrete placed by any other method. On certain pier and foundation work, the pneumatic method has shown a considerable economy, and in some instances it has been practically the only way the concrete could have been placed with anything like reasonable economy and speed.

The horizontal placer, because of the great saving in head room, is usually preferable to the vertical type. Its other advantages are less air required for a given length of shot, greater capacity, and the fact that it is almost impossible to get a block in the machine, if it is properly operated. Originally this machine was made in



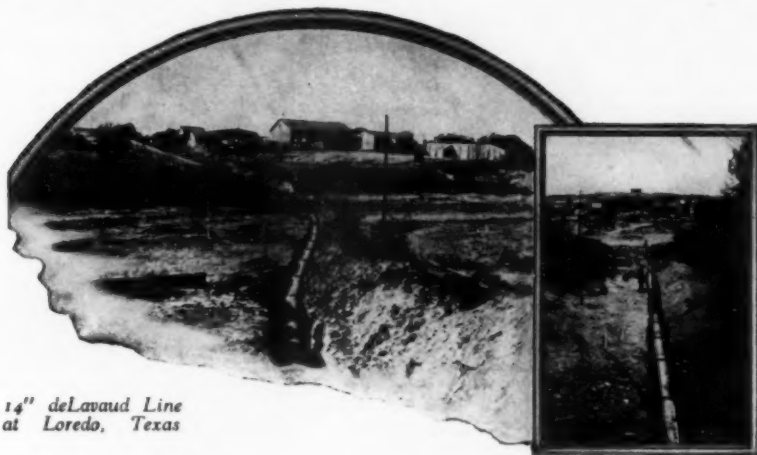
CONCRETING
THREE HEADINGS
FROM
ONE SET-UP
OF A
RANSOME
PNEUMATIC
CONCRETE
PLACER
ON
THE
NEW YORK
SUBWAYS

duit. The great advantage of this is that it can be used in places where there is little head room. The action is the same as in the vertical type, except that the worm conveyor, which may be regulated to any desired speed, takes the place of gravity in the vertical type with the conical bottom.

This pneumatic placer is primarily designed for placing concrete in difficult, inaccessible places, economically. Perhaps the greatest saving is found where it is necessary to line railroad tunnels under traffic, as all that is needed inside the tunnel, other than the forms, is the 6-inch conveying pipe, and concreting can be carried on practically continuously, regardless of traffic. In lining tunnels, subways, etc., not under traffic, this method has become almost universal. There is a saving over the other methods on jobs of this nature, and a much better grade of concrete is secured. While it is almost

only one size, having a capacity per shot of 7 to 9 cubic feet, but later the standard machine has had a capacity of 14 cubic feet to a shot, although this latter machine is often used for shots of 7 cubic feet. The number of shots per hour depends upon local conditions. However, it should be an unusual job where an average of 40 could not be maintained, and if the plant is properly laid out, 60 shots or more per hour can be made.

In all work, except the lining of live tunnels, it is best to keep the placer up close to the forms and bring in the concrete in cars. The placer can either be attached to the form carriage or can follow this closely on its own wheels. The worm on the 7-cubic-foot placer is driven by a $7\frac{1}{2}$ -horsepower electric motor, and on the 14-cubic-foot placer by a 10-horsepower. While electricity is the most satisfactory way of driving the worm



14" deLavaud Line
at Loredo, Texas

deLavaud Centrifugal Cast Iron Pipe in large diameters

OVER two and three quarter million lengths of deLavaud centrifugal pipe are now installed, in diameters from 4" to 20".

The many satisfied users find that the ease of handling deLavaud pipe is particularly true in the larger sizes—on account of its self-centering bell and its lighter weight which, of course, is proportionately greater as the size of the diameter increases.



Write for special literature concerning the manufacture and use of deLavaud centrifugal pipe.

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compressed air motors or gas engines can be used.

The vertical placer is recommended for use where the coarse aggregates in the concrete are 2 inches and up, or where unusually long shots are necessary, and in the latter instance, only when the cost of air is low. This placer is built in one size only, having a capacity of 10 cubic feet per shot.

The air pressure required for operating under ordinary atmospheric conditions is 100 pounds, although in actual practice this drops to 80 or 90 pounds per square inch. When the placer is used under air, the better method is to keep the placer in the compressed air, and lock the concrete through. The actual pressure required, when the placer is operating in compressed air, is the same as above, plus the amount of pressure under which the job is being carried on. If the work is in 20 pounds of air, then the pressure to operate the placer is 120 pounds. The amount of free air required at the pressure given above depends on the number of batches shot per hour, the size of the batches, the length of the shot and the size of the discharge line.

In estimating the air requirements, the capacity of the air receiver is most important. It depends on the distance the placer is from the compressor, and it should always be kept as close to the placer as possible.

Figuring 60 shots per hour and a 6-inch discharge line, the 7-cubic-foot horizontal placer will operate on 300 cubic feet of free air per minute

for shots up to 100 lineal feet, plus an additional cubic foot of air for every lineal foot beyond this distance. The 14-cubic-foot horizontal placer, when handling 7-cubic-foot batches, will operate on the same amount of air. The 10-cubic-foot vertical placer, with 6-inch discharge line, will require 500 cubic feet for the first 100 feet, and then 1 cubic foot for each additional lineal foot.

As far as cement content goes, any mixture, either rich or lean, can be handled. A medium wet mix will give the best results, so far as the finished surface goes. An absolutely dry mix with no water whatsoever can be used, if conditions require it. A sloppy mix will not work satisfactorily and neither will it give good concrete.

With the horizontal placer, the coarse aggregate should not run larger than what is known as 1½-inch gravel or stone. For the vertical type, a coarse aggregate passing a 4½-inch ring may be used.

Pneumatic grout mixers and placers manufactured by Ransome are used on many difficult construction problems and save time and money. Among the many uses for them are: to seal the fissures, rifts, etc., in tunnel work and check the flow of water; to repair wash-outs under dams, walls, foundations, piers, abutments, and to seal caissons and cofferdams. Bed rock foundations, back-fills, and dry-packed masonry behind timbers or forms in tunnels, shafts, etc., are solidified by forcing in grout at convenient points, thereby adding strength.



CATERPILLAR 30 PULLING TWO 3-YARD LA PLANT-CHOATE WAGONS ON THE ELDORADO, KANSAS, WATER-WORKS PROJECT

This photograph, furnished through the courtesy of H. W. Cardwell, President of the H. W. Cardwell Co., Inc., Wichita, Kansas, shows one of the outfits which took the place of the old three-up and four-up dump wagons and which are "doing their stuff" at the rate of six yards every five minutes with a profit to the Stimson Construction Co., which purchased the outfit from the H. W. Cardwell Co. The complete outfit owned by the Stimson Construction Co. consists of four Caterpillar 30's, six 3-yard wagons, a LaPlant-Choate Bulldozer, and a 10-ton Caterpillar. The average number of yards of pay dirt per day is around 1000 and when there were two months of wet weather during this last summer, five sets of lighting equipment on the tractors pushed the job towards completion to make up for the lost time in bad weather. It was possible to run the outfit well into the night



Hennepin County, Minn. Road No. 7

This Asphaltic Concrete pavement was
constructed on a Black Base with

Stanolind Paving Asphalt

*Asphalts for Every
Purpose*

STANDARD OIL COMPANY

(INDIANA)

910 SOUTH MICHIGAN AVE. CHICAGO, ILLINOIS

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A New Type of Pull Shovel

Attachment Incorporates a New Principle in the Trench Hoe Field

A NEW type of pull shovel or trench hoe, which offers some unusual advantages for sewer and excavating work, is being manufactured by The Thew Shovel Co., Lorain, Ohio. This new attachment, the Back Digger, incorporates a new principle in this field and is more than a trench

or spoil pile—after which the dipper can be instantly dumped. When dumping close, much time is saved because it is unnecessary to swing the dipper to the extreme limit each time to empty it completely. When sticky material clings to the dipper, the operator can shake the dipper to dislodge posi-



**THE
NEW THEW
BACK DIGGER
FOR USE WITH THE
LORAIN 60 OR 75
SHOVEL**

machine, being very efficient in cellar work and other kinds of digging. It can be attached to any Lorain-75 or Lorain-60 shovel now in the field, the change being made easily and quickly. The principal difference between this and other types of shovels is in the control of the dipper. This can be tilted by the operator to any angle desired, at any stage of the digging or dumping operation and held in position or changed by the operator at will.

Instead of spilling the dipper load through the entire arc of the digging arm as with the stationary dipper type, this tilting dipper permits the operator to hold his load until he has spotted the dipper exactly where it is wanted—over a wagon, truck

tively and completely all the unspilled remainder.

In basement digging this control of the dipper tooth angle at any position permits trimming the sides and bottom of the excavation or making a straight vertical cut at the start of a trench or at the finish.

The tilting dipper is also a great aid in back filling. The dipper can be pulled to the edge of the trench in a horizontal position, pushing the dirt before it. It can then be tilted to empty the dipper into the trench. The ability to hold the dipper in any position wanted while back filling permits cleaning up the entire spoil pile without gouging into the solid ground beneath it.

Manual of Accident Prevention in Construction

The Associated General Contractors of America, Munsey Building, Washington, D. C., has recently issued its Manual of Accident Prevention in Construction, price \$1. Its preface states, "Information on accident prevention in construction is very limited, although a number of books on accident prevention have appeared since the safety movement became a vital force in industrial safety work. Accident prevention in construction is in its infancy, but rapidly undergoing expansion and the preliminary stages of standardization. But we believe it is gaining its permanent status. The literature of safety is scattered through an immense range of periodicals, 'house organs,' regulations, rule books, bulletins and the transactions of technical and trade associations.

"The future progress of the accident prevention movement, the decision whether it shall advance with sufficient strength to reduce the apparent increase of accidents in construction for which mass production and mechanical methods are largely responsible, rests with the general contractors of the United States."

Suppose the wrench slips?

If you must use your weight, brace yourself against a fall.

PERSONAL RESPONSIBILITY FOR PERSONAL SAFETY IS NECESSARY

Dependable Faster and Better Concrete Curing

The use of Solvay Calcium Chloride in concrete road construction means faster and better curing, and the best concrete roads.



—as an admixture

Solvay Calcium Chloride used as an admixture cuts setting time. It gives greater early strength, and assures final strength and long wear. It cures uniformly throughout the entire thickness of the concrete.

Solvay Flake Calcium Chloride in the mix speeds up the set so that under proper control the concrete gains enough strength to withstand traffic in as short a time as 4 days.

—or on the surface

The surface method of curing concrete roads with Solvay Calcium Chloride marks a distinct advance over older methods. Solvay should be spread over the surface of the road as soon as the concrete can support the weight of a man. The use of a Solvay Hand Spreader makes this complete curing process a one-man job!

SOLVAY CALCIUM CHLORIDE

is sold in 100-lb. moisture-proof bags and in drums of 375 lbs. net weight, from 75 conveniently located distributing centers.

Send for Booklet No. 2051, "Curing Concrete Roads with Solvay Calcium Chloride"—and nearest stock point.

SOLVAY SALES CORPORATION

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See our exhibit—American Road Builders Convention,
Cleveland, January 9-13, 1928

A Double-Drum, 3-Speed, Automotive Hoist

Powerful, Dependable, Inexpensive, Light and Compact

HOISTS that are automotive in principles of design and in construction, built of the superior materials common to the automotive industry but heretofore used little in the manufacture of hoisting machines, and that have strength and capacity, durability and efficiency for the hardest jobs, are being developed by the Ersted Manufacturing Co., Portland, Ore.

The Ersted Universal, Type S.F., hoisting engines are double-drum, 3-speed and self-starter equipped, with 5,000 pounds capacity. They are designed to meet every normal requirement for the hoisting of concrete, steel and other materials used in the construction of ordinary buildings, bridges and other structures, for light pile driving, smaller dragline installations, derrick operations, etc.

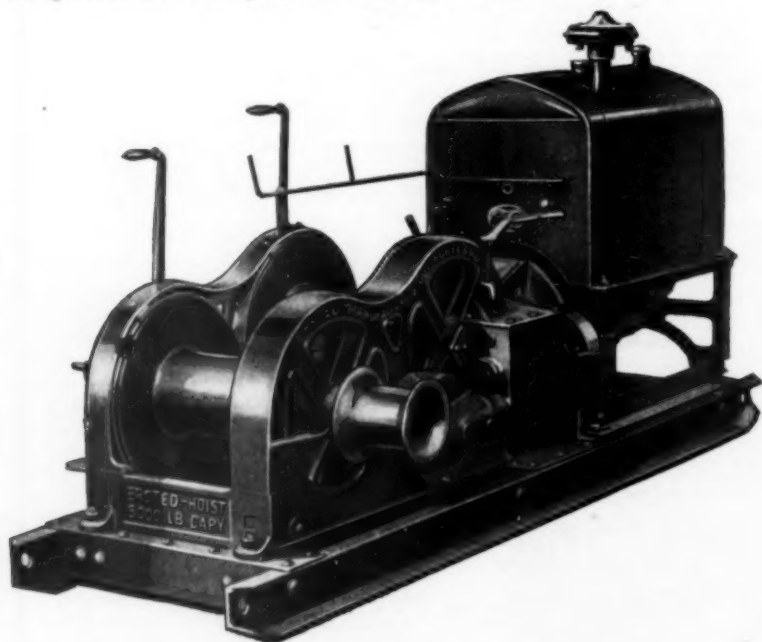
The Ersted-Ford motor with which these engines are powered, is fundamentally the Model "T" Ford engine, adapted to industrial service.

The 3-speed, selective gear transmission built integrally with the hoist instantly adapts the power to the requirements of the work being done. It gives maximum utility and efficiency, fast speeds for light loads and slower speeds for heavier loads.

Full ball bearing construction gives an efficiency of over 90 per cent in conversion of engine power to cable pull, enabling nearly 40 per cent more work to be accomplished than ordinarily.

The light weight and portability of the hoist are features that appeal to the contractor. The unit can be loaded quickly on any light wagon or truck and hauled to and from jobs at little cost, avoiding delays and saving most of the usual costs of putting hoists on the work. It is so compact that it can be moved into buildings through ordinary doorways and used in many unusual places.

The Model "T," 20-horsepower engine, with special cast crank case and counter-weighted fly wheel, eliminates vibration and gives stability necessary for industrial purposes. A special radiator, 17-inch diameter fan and centrifugal water pump give adequate cooling. The Ford generator and self-starter, Willard storage battery and Delco-Remy interrupter type ignition are used. The governor is the enclosed fly ball type, gear driven from the timer shaft with manual variable speed and idling control of 800 to 1,600 r.p.m. All engine parts subject to wear are standard Ford parts.



THE
NEW ERSTED
HOIST
WHICH HAS
5,000 POUNDS
CAPACITY

Accident prevention in construction is in its infancy, but rapidly undergoing expansion and the preliminary stages of standardization.

FOR JOB-DRY MATERIALS

BAGS OF CEMENT	7.50
WATER GALS. = BAG	8.50
CU YDS. = SAND	.43
CU YDS. = STONE	.87

PROPORTION (MIX)

BAGS OF CEMENT	1.00
WATER GALS. = BAG	7.50
CU YDS. = SAND	4.30
CU YDS. = STONE	8.60

FOR DAMP MATERIALS

BAGS OF CEMENT	7.50
WATER GALS. = BAG	8.50
CU YDS. = SAND	.43
CU YDS. = STONE	.87

CONCRETE

FOR PERMANENCE

PENN-DIXIE CEMENTS

FOR SERVICE-SAFETY

BUY AT PENN-DIXIE SIGNS

BAGS OF CEMENT | 1:2:4
CU YDS. = SAND | MIXTURE

THICKNESS IN INCHES

BAGS OF CEMENT | 1:2½:5
CU YDS. = SAND | MIXTURE

CU YDS. = STONE | MIXTURE

QUANTITIES ABOVE ARE THOSE REQUIRED FOR:

100 SQ. FT. OF WALL OR FLOOR

OF THICKNESS SHOWN

WITH PROPER MIXING, CURING AND TEMPERATURE CONDITIONS, WATER AS SHOWN PER BAG OF CONCRETE LEFT WILL GIVE UNIFORM STRENGTH. THE COMPRESSIVE STRENGTH OF SUCH CONCRETE AT 28 DAYS IS APPROXIMATELY 3000 LBS. FOR 4 GALS., 1000 LBS. FOR 7½ GALS., AND 1000 LBS. FOR 9 GALS. OF WATER PER BAG. INCREASE WATER FOR STIFFER MIXTURES. DECREASE AGGREGATE FOR MORE WORKABLE MIX. REMEMBER: BRICKS, WATER SOLLS, ETC. YOU CAN SAVE MONEY ON LABOR WHEN BY DESIGNING MIX FOR MATERIALS TO BE USED. DATA ON THIS RULE ARE FOR AVERAGE CONDITIONS.

CLEAN GRADED SAND AND STONE OR PEBBLES ¼" TO 2 ½" IN QUANTITIES AS GIVEN ABOVE ARE REQUIRED FOR:

ONE CU. YARD OF FRAMED CONCRETE

ONE BAG OF CEMENT = 1 CU. FOOT
ONE BAG OF CEMENT WEIGHS 94 LBS. NET
ONE BARREL OF CEMENT = 4 BAGS

ACTUAL SIZE REPRODUCTION OF CONCRETE AND LUMBER SCALE

ASK FOR ONE—THERE IS NO CHARGE

PENNSYLVANIA-DIXIE CEMENT CORPORATION

131 EAST 46TH STREET
NEW YORK CITY

JAMES BUILDING
CHATTANOOGA, TENN.

OFFICES AND SALES REPRESENTATIVES THROUGHOUT
THE EAST AND SOUTH

BUFFALO-SPRINGFIELD ROLLERS



All Types and Sizes
With or without Scarifier attachment
Helps you finish the job on time

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information

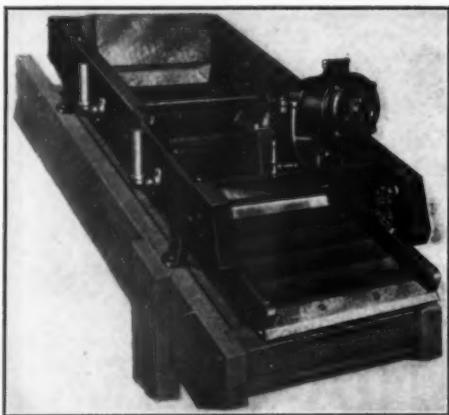
The Buffalo-Springfield Roller Co. SPRINGFIELD OHIO

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A Screen for Sizing and Screening Construction Material

New Vibrating Mechanism is Outstanding Feature

THE James screen for sizing and screening wet and dry sand and gravel, crushed stone, abrasive and other similar material is being manufactured by the Norwood Engineering Co., Florence, Mass. This screen was developed by U. S. James, mechanical and metallurgical engineer of Newark, N. J., and is based on a new and highly efficient principle of vibration. It has



JAMES SCREEN FOR WET SAND, SHOWING VIBRATOR

proved its ability to handle heavy loads of any screenable material and do an accurate, efficient and economical job.

In perfecting this screen, vibration was used in order to give higher capacity and absolute freedom from blinding. Sectional screens were developed to reduce the expense of replacement of an entire screen when worn in part only and washing trays were designed to disintegrate the accumulation of mud balls on wet screening.

The present vibrator consists of only three moving parts; a gyrating ram weighing over 30 pounds operates against a heavy piston, which, in turn, transmits the shock through a small anvil to a

wooden cross member connecting the hanger bars, which carry the screen frame. This ram gyrates at 300 r.p.m. and each of its six chilled steel sockets collides with the hardened steel contact points of the piston, giving to this latter member 1,800 head on collisions per minute. These repeated shocks transmitted to the screen in this manner not only force every possible ounce of material through the meshes, but also keep the screen from blinding and give uniform vibration over its entire surface.

The vibrator is housed in a heavy dust, dirt and waterproof cast iron casing and requires a change of oil but once in every three or four months. The screen frame is suspended by flexible vanadium steel hangers so that neither dust, grit nor moisture can affect the free movement of the screens.

The screen frames are built in sections, which are interchangeable. Every six square feet of screening surface may be removed and replaced under actual working conditions in less than two minutes, thereby affording a saving on screen cloth as well as in time.

When screening material finer than 3/16-inch in diameter, by the wet process, auxiliary washing trays are located every 2½ feet across the screen area, so as to disintegrate the accumulation of mud balls and by the addition of a sufficient amount of wash water the fine grains are forced through the meshes with great rapidity. This new feature, according to the manufacturers, adds from 25 to 50 per cent to screening efficiency.

The screen operates with a 1-horsepower motor or from a line shaft. Screens up to 18 feet in length operate satisfactorily with the same size motor, there being the same uniformity of vibration over the screening surface of a large screen as over a small one. The manufacturers have acquired the United States, Canadian and Mexican manufacturing and selling rights on this screen and a laboratory equipped with both the James wet and dry screens with different wire or cloth screen sections for testing and making screen analyses will be established at either Florence or Boston, Mass.

Hints for Winter Concreting

1. Enclose all work with canvas and heat with salamanders, especially bases of exterior columns.
2. Provide one salamander for every 300 square feet of floor area; each should have a heat hole.
3. Provide water barrels to extinguish fires; prevent canvas from blowing against salamanders.
4. Heat both water and aggregates.

5. Keep accurate temperature records, maintaining at least 60 degrees Fahrenheit within enclosure for five days and at least 40 degrees for ten days additional in severe weather.

6. Do not depend upon anti-freezing compounds instead of protection and heat.

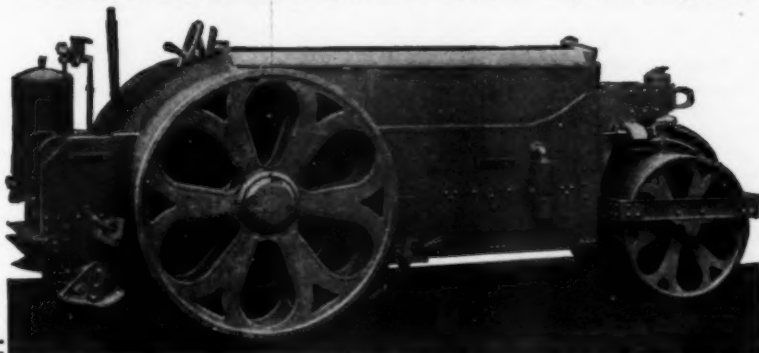
Profit by others' experiences and use these rules.

HUBER

MOTOR ROLLERS

Four cylinders—four sizes (5-7-10-12 tons). Look to Huber for easy single-lever control—short turns—quick action—low up-keep—unusual dependability. The Huber is endorsed and used by leading contractors everywhere. It will be worth your while to send for free catalog giving full mechanical details.

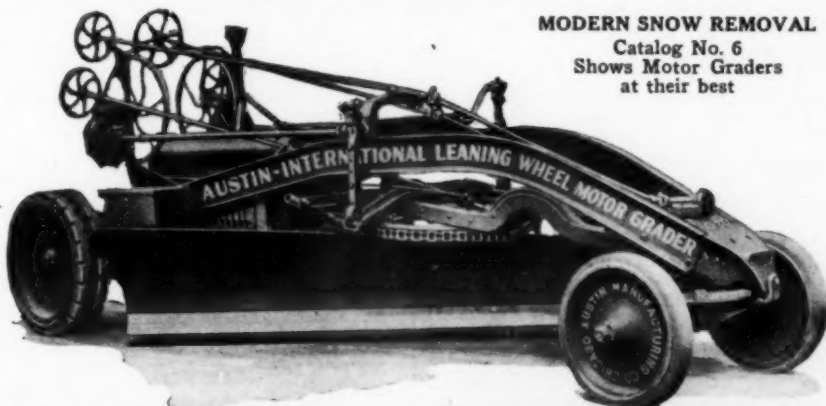
THE HUBER MFG. CO., 308 E. Center St., Marion, Ohio



IT WON'T BE LONG NOW!

That splendid machine that throughout the year maintains your roads can be kept on the job clearing the highways when snow flies. Write for prices on the special snow blade. The leaning wheels won't slip.

MODERN SNOW REMOVAL
Catalog No. 6
Shows Motor Graders
at their best



THE AUSTIN-WESTERN ROAD MACHINERY CO.
400 North Michigan Avenue Chicago, Illinois

Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.

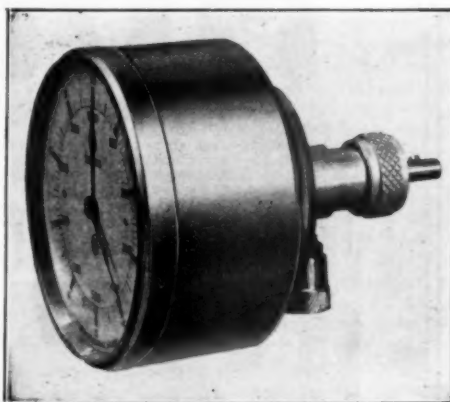
Unique Machine Tells Time Truck Runs

Compact Unit Dependable and Accurate

CONTRACTORS are particularly interested in knowing just how long their motor trucks are actually operating throughout the day, week, month or year and they also wish to know the length of time that cranes, hoists, tractors and construction equipment are really in operation.

The Hasler Tel Running-Time Meter sold by R. W. Cramer & Co., Inc., 136 Liberty Street, New York, makes this possible. This clock-like attachment is mounted on any rotating member of the machine and registers the total time the machine is operating from the time the unit is attached, without the need of winding or replacing charts. The total elapsed operating time is read directly from the face of the Hasler meter. It registers and totalizes the elapsed operating time accurately and dependably, irrespective of the speed of the machine on which it is installed and irrespective of the direction of rotation or variation of direction of rotation. The manufacturers state that it is unaffected by vibration, magnetism, gravity, or extremes of temperature.

The running time meter weighs only 28 ounces and measures $3\frac{1}{2}$ inches in diameter and is $2\frac{1}{2}$ inches deep. The unit cannot be tampered with and it is impossible to advance or retard the registration of time or to augment or diminish the accrued total. It is made in three sizes the first with



THE HASLER TEL-RUNNING TIME METER

the dial calibrated to read up to 100 hours and repeat. This unit can be read directly to three-fifths of a minute and by estimation to $1/5$ -minute. The second type registers up to 1000 hours and repeat and can be read directly to within 6 minutes and by estimation to 2 minutes. The third registers up to 10,000 hours and repeat and can be read directly to one hour and by estimation to within 20 minutes.

A 20-ton Gas-electric Locomotive

First of New Series Is Delivered to the City of Winnipeg Hydro Electric System

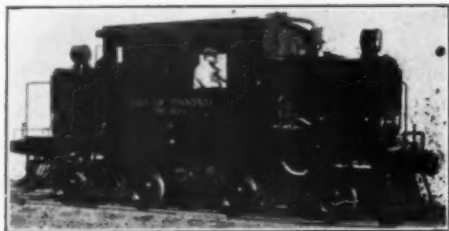
FREIGHT and passenger service will be handled by the new gas-electric locomotive recently purchased by the City of Winnipeg, Canada, from the Davenport Locomotive and Manufacturing Corporation, Davenport, Iowa. This is the first of the 20-ton double truck series of gas-electric industrial locomotives of this company and it will be used by the City of Winnipeg Hydro Electric System. It is similar in construction to the 25- and 30-ton Davenport models.

Flexibility of operation, even distribution of power and speed of the engine are features which Frank B. Wylde, Superintendent of Transportation of the Canadian company saw demonstrated in

the trial run for final inspection at the locomotive works. "We expect to do with this locomotive most of the work that we have been doing with a 76-ton steam locomotive, keeping the large steam locomotive in reserve for any excessive hauling operation," Mr. Wylde said. The City of Winnipeg Hydro Electric System is a municipally owned company which supplies electrical power direct to the City of Winnipeg and furnishes wholesale power to all portions of the Province of Manitoba.

The equipment used in building this locomotive was the most modern equipment available, such as shutters on radiators for extreme weather conditions, snow plow, special arrangement of cab, with its lighting, ventilating and hot water heating systems, air sanders, straight and automatic air brakes, power take-off for direct current up to 240 volts, for lighting, heating, cooking, operating electric motors, windlass, pumps, etc. This locomotive has been built to maintain a schedule of 25 miles per hour over heavy grades and at temperatures varying from 47 degrees Fahrenheit below zero to 110 degrees above.

The new locomotive will be used for freight and passenger service from the end of the Canadian Pacific railroad at Lac du Bonnet through a dense forest for $25\frac{1}{2}$ miles to the power plant on the Winnipeg River, known as Point du Bois.



A NEW DAVENPORT 20-TON GAS-ELECTRIC LOCOMOTIVE RECENTLY DELIVERED TO THE CITY OF WINNIPEG, CANADA

BROOKVILLE LOCOMOTIVES



Dependable power, plus local service
on power units

Suited for every contracting
need.

15 Standard Models, ranging
from 1½ to 12 tons. Models
suited for handling from one
small industrial car, up to
heavy-duty requirements.

1½- to 3-ton Models Ford
truck powered. 3½- to 8-tons
Fordson powered. 5- to 12-
tons McCormick-Deering
powered.

"Get the facts from Brookville"

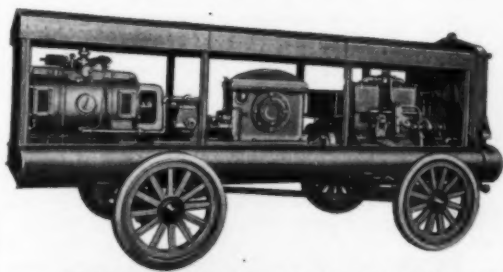
Brookville Locomotive Company

Brookville

—U. S. A.—

Penna.

THE RIGHT COMPRESSOR FOR ALL KINDS OF PNEUMATIC TOOL WORK



READY FOR EVERY JOB—

HORIZONTAL TYPE — DOUBLE
ACTING — SLOW SPEED — STURDY
AND RELIABLE — LONG LIFE — LOW
UPKEEP.

THE TRAYLOR 12 in. x 10 in. PORTABLE COMPRESSOR

Will operate five rock drills, fourteen chipping hammers,
or other pneumatic tools in proportion

Send the Coupon—Now!

CEMENT-GUN COMPANY, Inc.
Allentown, Pa.

New York Pittsburgh Chicago
Denver Salt Lake City
San Francisco New Orleans Buffalo

Cement-Gun Co., Inc. Date.....
Allentown, Pa.
Please send full information on the TRAYLOR
PORTABLE COMPRESSOR. ☐
I would like to have your representative call. ☐
Name
Address
City State

Yes—we would like you to mention the CONTRACTORS AND ENGINEERS MONTHLY.

A New Wheelbarrow for Light Construction Work

Quick Assembly of Parts, Strength and Durability Are the Features

NEW and high grade features are to be found in the "No. 100" general purpose wheelbarrow of the General Wheelbarrow Co., 3140 East 65th Street, Cleveland, Ohio. It is a 3-cubic-foot capacity, steel leg, steel tray barrow, which the manufacturers say is stronger, holds dirt better,



A 3 CUBIC FOOT GENERAL PURPOSE BARROW

handles better, is better looking and has a longer life than other barrows in its class.

The 18-gage rounded narrow front tray is steel,

welded and reinforced. Steel braces support the front of the tray, which is mounted on risers to improve the levelling qualities. The barrow holds dirt without spilling and the entire wheelbarrow is narrow enough to go through gates and narrow passages, but has ample width between the handles for comfortable, steady wheeling.

The $\frac{5}{8}$ -inch axle has a special lock to prevent the axle nut from losing off. The 8-spoke steel wheel with full length 6-inch hub promotes true, steady running and eliminates wobbling. Permanently tight riveted channel steel legs have broad flat bottoms and the hardwood handles are grooved to fit the channel steel legs.

The wheelbarrow is quickly and easily assembled—four bolts through the frame and two to the front of the tray complete the job. The legs come riveted complete and there are no leg braces or cross braces to put together.

Drop Forged Conveyor Chain

It Is Easy to Install, Has Great Strength, Light Weight and Effects Power Saving

DROP forged conveyor chain in both open and closed link types for general use on draglines, bucket or floor conveying or monorail installations is being manufactured by the Moore Drop Forging Co., Springfield, Mass. Reduction of operating and maintenance costs, and greater continuity of operation, due to practical elimination of tie-ups for repairs and replacements, are important features.

These Morco chains have either malleable or drop forged attachments, such as scrapers, pushers, trolley extensions, car hauls, bucket attachments, etc. The malleable attachments are secured to the center links by means of bolts and the drop forged attachments are formed integral with the side links.

The patented construction of the chain employs only two parts—center link and side link. The chain is easily taken apart or assembled instantly without the use of tools. This is because of the absence of any rivets in the construction. The chain can be taken apart at any link rather than at every 8 or 10 links, and it will not buckle or come apart in service.

A saving of power is effected in this chain be-

cause of its lightness per foot. The construction eliminates the use of loose pins, which is a decided advantage in handling coarse materials, where a pin type chain would be subject to dual wear, both on the outside of the chain and the space between the pin and the slot in which the pin is held. A



A MORCO CLOSED LINK TYPE DROP FORGED CONVEYOR CHAIN

better bearing on every tooth of the driving sprocket is afforded by the unusual construction of the open link chain. Each link engages with the sprocket teeth, producing an even pull, comparable to the grip on a pulley. The chain is designed to fit practically all standard sprockets.

The special high carbon steel, from which the chain is made, becomes, after drop forging, very resistant to the corrosive effects of sulphur water or acidulous ores, thereby prolonging the wearing life of the chain.

Davenport Locomotive Works Reorganizes

THE manufacturing plant and the entire business of the Davenport Locomotive Works has been acquired and will hereafter be conducted by the Davenport Locomotive and Manufacturing Corporation, Davenport, Ia., according to a recent statement of E. Parmly, Jr., President. This corporation, in addition to the manufacture of gas-electric and steam locomotives, makes grey iron castings, forgings, boilers and fabricated sheet metal. Its foreign representatives are the International General Electric Co. and the Canadian General Electric Co.

New T. L. Smith Distributor

ANNOUNCEMENT has been made of the appointment of the Stuart S. Smith Co., 19th and Indiana Streets, San Francisco, Calif., as distributor of mixers and pavers for The T. L. Smith Co., Milwaukee, Wis., for the northern California and western Nevada territories.

Robinson & Steinman Move N. Y. Office

ROBINSON & STEINMAN, consulting engineers, New York, have announced the removal of their offices to the Roebling Building, 117 Liberty Street, New York.

What are your ROAD SHOULDER MAINTENANCE COSTS?



We can show you a tremendous saving with the use of the **BRABAZON SHOULDER MAINTENANCE MACHINE**.

Materials mechanically applied. Attaches to your present motor dump-truck equipment.

Write or wire for particulars

BRABAZON MANUFACTURING CO.
STOUGHTON WISCONSIN

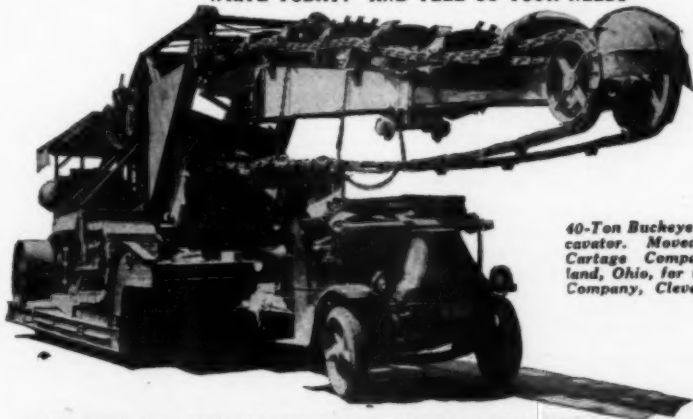
LIKE THE STRONG MAN

The strong man handles enormous weights. Endowed with great strength he must ever be ready to resist unusual strains. Like a strong man, Rogers Heavy Duty Gooseneck Trailers handle enormous weights. Reinforced at every point to insure maximum strength, they too, resist unusual

strains. In addition to transporting heavy loads safely and speedily, Rogers Trailers save loads, roads, time and money.

Rogers Heavy Duty Gooseneck Trailers are built to meet any requirement.

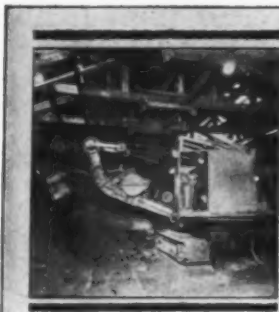
WRITE TODAY! AND TELL US YOUR NEEDS



40-Ton Buckeye Trench Excavator. Moved by Brown Cartage Company, Cleveland, Ohio, for the Kassoul Company, Cleveland, Ohio.

ROGERS BROTHERS CORPORATION, Albion, Pa

Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.



These Catalogs are Useful

THE catalogs and pamphlets listed below are available for free distribution. Contractors and Engineers who check over these pages each month and write for such material as interests them, will find this a valuable means of keeping up to date on the subject of machinery and equipment.

LOCOMOTIVES FOR POWERFUL, EFFICIENT HAULAGE

Bulletin 2723 of the Geo. D. Whitcomb Co., Rochelle, Ill., fully describes and illustrates locomotives for the hardest kind of haulage, that are mechanically correct, designed to work and built to overwork, that are fast, cheap and have a minimum of maintenance cost.

A PORTABLE LINK SAWING MACHINE

The "Wolf" portable link sawing machine that cuts five times as much in the same time, that is an economical means of cutting, piling and framing timber on large construction projects, that will operate in more confined spaces than hand cross-cut saws, and that is made in several sizes, is described in a pamphlet of the Reed-Prentice Corporation, Worcester, Mass.

A SCREEN FOR CONSTRUCTION MATERIAL

The James Screen for sizing and screening wet and dry sand and gravel, crushed stone, abrasive and other similar material and which has a new vibrating mechanism as its outstanding feature, is being manufactured by the Norwood Engineering Co., Florence, Mass., and is described in literature which is free on request.

ROAD BUILDERS' PUMPS WITH NEW OILING SYSTEM

A duplex, double acting piston pump, Type "EW," with a new, automatic, simple and foolproof "Fluid Oil" system, that is built in several sizes with capacities of from 35 to 110 gallons per minute and will operate at various pressures up to 425 pounds, is described and illustrated in Technical Data Sheet No. 140 of the Novo Engine Co., Lansing, Mich.

A NEW TYPE OF PULL SHOVEL

A new type of pull shovel, the Back Digger, that can be attached to any Lorain-75 or -60 now in the field, that incorporates a new principle in the trench hoe field and offers some unusual advantages for sewer and excavating work, is being manufactured by The Thew Shovel Co., Lorain, Ohio, and is described in free literature of the company.

A GUARANTEED TRUCK HOIST

Bulletin 178 of The Heil Co., Milwaukee, Wis., describes a two-year guarantee on its hydro twin-cylinder hoists, that insures the owners against maintenance costs and assures protection against breakdowns. This bulletin is free to interested contractors and engineers, on request.

ECONOMY IN CONCRETE FORMS

A guaranteed way of saving labor and materials when building concrete forms is fully explained and described in a comprehensive booklet that is being published by the M. & M. Wire Clamp Co., Minneapolis, Minn. This catalog gives the complete line of equipment manufactured by this company, including wire clamps, splicing clamps, column clamps, adjustable shores, targets, screed gauges, sheeting darts, invisible ties, strip ties, tie rod clamps, wire cutters and nippers, all of which eliminate the use of special tools for placing, releasing and adjusting, and which are all built along the lines of one uniform system.

A NEW SUBGRADE TESTER

A new subgrade tester that is in accordance with the standards recently adopted by the Pennsylvania State Highway Dept., that is used to check the subgrade just before the concrete slab is placed, and that is adjustable for either 16-18 foot or 18-20 foot roads, is described in literature of The Lakewood Engineering Co., Cleveland, Ohio.

BATH-TUB BODIES FOR WET CONCRETE

A special bath-tub dump body with extension sides that handles wet material rapidly and profitably, with the minimum of adherence to the sides of the body and the maximum of loads, is described in literature of the Wood Hydraulic Hoist & Body Co., Detroit, Mich., which may be secured free on request.

GRAPHITE PIPE JOINT COMPOUND

Circular 148-D of the Joseph Dixon Crucible Co., Jersey City, N. J., describes graphite pipe joint compound that does not set or harden, makes absolutely tight joints and saves time, fittings and tools. It is available free on request.

STEEL EXTENSION WHEELS FOR RUBBER TIRES

Literature of French & Hecht, Davenport, Iowa, and Springfield, Ohio, describes steel extension drive wheels with cleats that extend partly over the rubber tire on the inside and protrude in the opposite direction from the outer edge of the wheel rim, and that are built in all sizes required to fit any wheel tractor.

NEW 2-CYLINDER 6 H.P. ENGINE

A new model, 2-cylinder engine, developing as high as 6 horsepower and with its working parts interchangeable with other Le Roi models, has been put on the market by the Le Roi Co., Milwaukee, Wis., and is described in literature which is free to interested contractors and engineers.

A NEW HEAVY-DUTY LOADER CATALOG

The George Haisa Mfg. Co., Inc., 142nd Street and Park Ave., New York, N. Y., has just issued a new catalog No. 527 describing the Haisa creeper heavy-duty loader, announcing notable improvements in this loader such as the enclosure of the crowding worm mechanism in the transmission box, the placing of the elevator on the longitudinal center line of the machine and improvements in material used. The catalog also contains a resume of the handling of concrete aggregate for road jobs with loaders, together with useful diagrams and tables.

A PLUG FOR WATER MAINS

The Safety Gas Main Stopper Co., 523 Atlantic Avenue, Brooklyn, N. Y., will be pleased to send complete information and prices regarding its stopper for use in gas, oil, and water mains and drain pipes to contractors interested in this device.

ALL-STEEL AUTOMOTIVE HOISTS

Catalogs describing Ersted all-steel, 3-speed automotive hoists, including the Type S.P. 20-horsepower hoist, with a capacity of 4,000 pounds line pull and weighing only 1,900 pounds, may be secured without obligation from the Ersted Manufacturing Co., 927 Clackamas Street, Portland, Ore.

PROPORTIONING CONCRETE AGGREGATES BY WEIGHT

The Butler Bin Co., Waukegan, Wis., has just issued its Bulletin No. 120, under the title "Butler Weighing Hoppers." This is a 12-page, profusely illustrated Bulletin, describing in detail the methods of proportioning aggregate by weight. Copies may be secured free on request from the manufacturer.

DIESELS FOR MOBILE EQUIPMENT

F. Van Rossen Hoogendyk, Graybar Building, New York, sole United States distributor for the Colodiesel engine for installation in shovels, draglines, tractors, road-building machinery, etc., in units from one to six cylinders, will be pleased to furnish complete information and prices on this diesel engine, which can also be used for stationary work.

COLO-DIESEL



**RAISE
THE EFFICIENCY AND
LOWER
THE OPERATING COST**

of your Mobile Equipment
by replacing your gasoline
motors, without material
changes in your engine founda-
tions, with 4-cycle, airless
injection, full-Diesel type —

**COLO-DIESEL
MOTORS**

*Write for
full details*

Sole U. S. A. Distributor

F. VAN ROSSEN HOOGENDYK
Graybar Building New York City



If you have a dumping problem!

Wood Dumping equipment is the answer. Wood
builds hoists and bodies for every purpose.

Hydraulic Hoists—3 Types

UNDERBODY
VERTICAL
HORIZONTAL

MECHANICAL HOISTS
HI-LIFT HOISTS
SELF-DUMPING HOISTS
STEEL DUMP BODIES

12 standard designs, special bod-
ies built to order when specified

Meet us at the Good Roads Show, Cleveland, January 9-13, 1928

*Catalog and all the
facts upon request*

WOOD HYDRAULIC HOIST & BODY COMPANY

Worlds Largest Builder of Dumping Equipment
DETROIT, U. S. A.

A NEW PORTABLE SAW RIG

A new portable saw rig, the Durex, that has a tilting table, 8 horsepower, 2 cylinder Le Roi engine and is designed for greater production, greater variety of uses and safer operation, is described in free literature which may be received from C. I. Longenecker, 251 Reed St., Milwaukee, Wis.

A NEW INDUSTRIAL TRACTOR

A new industrial tractor that has been built compact and low so that it can operate in close quarters, has a 10-foot turning radius, a 12-horsepower rating on the drawbar and 20-horsepower on the belt, is described in literature of the J. I. Case Threshing Machine Co., Racine, Wis., which is free on request.

PRECAST REINFORCED CONCRETE PIPE

The Newark Concrete Pipe Co., 462 Broad Street, Newark, N. J., will be pleased to send complete information, prices and sketches showing the type of joint furnished on Newark reinforced concrete sewer pipe which has low frictional resistance to flow and is easy to lay properly.

COLUMN CLAMPS

W.A.K. column clamps which are strong and lasting and can be used over and over again, fit any shape of column and are easy to put on and take off, are described in the W.A.K. circular, which may be secured on request from W. A. Kuhlman & Co., Toledo, Ohio.

TRACTOR GOVERNORS

A new illustrated folder has just been issued by the Pickering Governor Co., Portland, Conn., which will be of especial interest to all owners of Hart Parr tractors, especially those operating the older types, as it describes the C-1111 enclosed governor which is particularly adapted for use on the Hart Parr 20 and 30 models.

A GASOLINE DRAGLINE WITH CONTROL AND DIGGING POWER

The Erie Steam Shovel Co., Erie, Pa., will be pleased to send complete information and prices on the Erie Gas-Air shovel which is revolved by direct-connected swinging engines that run on compressed air and can swing at full power while pulling the drag cable at full power.

TRACTORS WITH POWER ON ALL FOUR WHEELS

The literature of the Four Drive Tractor Co., Big Rapids, Mich., describes the Fitch Four Drive tractor in which power is delivered to all four wheels, thus adding another pair of pullers and increasing the drawbar pull of the machine.

SMALL HOISTS FOR CONTRACTORS

"Handy Hoisting and Hauling" is the title of a booklet issued by Sullivan Machinery Co., 162 South Michigan Avenue, Chicago, Ill., which tells all about the Sullivan Turbinair hoist, a portable hoist which will lift a ton or pull a 50-ton car, and which can be operated by air, steam or electric power.

WHEELBARROWS OF QUALITY

The Sterling Wheelbarrow Co., Milwaukee, Wis., will be pleased to send to interested contractors and builders complete information regarding Sterling wheelbarrows and telling of their many points of advantage, as well as the complete and prompt Sterling service.

A BULLETIN ON GASOLINE POWER SHOVELS

A copy of Koehring Shovel Bulletin No. 8-6, describing Koehring heavy-duty shovels operated by gasoline engines for high bank work, deep digging, high dumping and shallow stripping or any other kind of shovel work without adjustment, will be sent free by the Koehring Co., Milwaukee, Wis.

CONCRETE ROAD FINISHERS

Complete information regarding Ord concrete road finishers for roads from 9 to 30 feet in width, level, curved or on a grade, and which will finish the full width of the road in one operation or half at a time or add a strip to an existing road, may be secured from A. W. French & Co., 8440 Lowe Avenue, Chicago, Ill.

HOISTING EQUIPMENT

Complete data about any type of Clyde hoisting equipment may be secured on request from the Clyde Iron Works Sales Co., Duluth, Minn., by contractors and builders interested in hoists and derricks.

PORTABLE COMPRESSORS

The Cement-Gun Co., Inc., Allentown, Pa., will be pleased to send complete information and prices on the Traylor portable compressor for drilling, gunning and chipping, and which will also operate five "Jack-hammers."

A LIGHT, FAST, DEPENDABLE CRANE

The Buckeye Model-O crane which can be used as a ditcher, crane or backfiller and which is light, fast and dependable, is described in a descriptive bulletin which may be secured from the Buckeye Traction Ditcher Co., Findlay, Ohio.

AN INEXPENSIVE TAPE HOOK

The new Lufkin improved inexpensive tape hook No. 252, which can be used with any standard 3/4-inch steel tape and which makes it possible for one man to make long or short measurements unassisted, is described in literature which may be secured from the Lufkin Rule Co., Saginaw, Mich., free on request.

A LUBRICANT FOR HEAVY MACHINERY

Complete information regarding D-A Lubricant which is especially adapted for use on heavy-duty machinery and is sold by distributors of this type of equipment everywhere, may be secured from the D-A Lubricant Co., Inc., Indianapolis, Ind.

A NEW CONCRETE PAVEMENT BOOKLET

The new Vibrolithic pavement booklet, a copy of which may be secured from the American Vibrolithic Corporation, Des Moines, Iowa, contains descriptions of the various types of Vibrolithic pavements now under traffic, illustrates the Vibrolithic method of construction and gives a list of communities in which these pavements have been constructed.

A NEW AND IMPROVED MOTOR GRADE

Model 28C, the new "Big 8" motor grader for the Caterpillar 2-ton tractor, that has recently been brought out by the Spears-Wells Machinery Co., Inc., Oakland, Calif., has an improved method of attachment to the tractor, heavy double springs of ample proportions and heavy frame construction, and is described in literature of the company, which is free on request.

A NEW WHEELBARROW FOR GENERAL WORK

The "No. 100" general purpose wheelbarrow in 3-cubic-foot capacity, with steel legs and steel tray barrow, that is strong, holds dirt better, handles better, is more durable and quickly assembled than ordinary, is described in literature of the General Wheelbarrow Co., 3140 East 65th Street, Cleveland, Ohio.

A CONVERTIBLE GASOLINE OR ELECTRIC POWER HOIST

The Type "20LG," contractor's hoist of the Dake Engine Co., Grand Haven, Mich., that can be converted from a single drum hoist to double drum and vice-versa, from gasoline to electric-driven power unit, and that is built for enduring service with ample strength and durability for strenuous duty, is completely described in a circular of the company.

A GRAVEL WASHER WITH A NEW SCRUBBING DEVICE

A new gravel washing device, the TelSmith-Ajax washer, which operates on the ball-mill principle in which the grinding action of the big rock eliminates clay and all extraneous matter, is described and illustrated in a free catalog, No. 266D, of the Smith Engineering Works, Milwaukee, Wis.

WOOD, IRON AND STEEL TACKLE BLOCKS

Illustrated catalog and price list No. 25, recently issued by the Western Block Co., Lockport, N. Y., describes and illustrates this company's complete line of wood, malleable iron and steel tackle blocks and sheaves for all purposes, and gives information regarding the weight and strength of wire and manila rope of different sizes.

A NEW 6-CYLINDER TRUCK

The Raggles Motor Truck Co., Saginaw, Mich., has recently developed a new Model 30, 1 1/2 to 2-ton, 6-cylinder truck on which it will be pleased to send information and prices to interested contractors.

A NEW, POWERFUL LIGHT-WEIGHT HOIST

Bulletin 1524, just issued by the S. Flory Manufacturing Co., Bangor, Pa., describes the new Flory Cub, a light-weight, compact and powerful small hoist designed for light-duty hoisting operations with a capacity of 1500 pounds single line pull at a drum speed of 125 feet per minute.

DROP FORGED CONVEYOR CHAIN

Drop forged conveyor chain in both open and closed link types for general use on draglines, bucket or floor conveying or monorail installations, that reduces operating and maintenance costs and affords greater continuity of operation, is described in literature which the Moore Drop Forging Co., Springfield, Mass., will send free on request.

METER TELLS MACHINE RUNNING TIME

The Hasler Tel running time meter sold by R. W. Cramer & Co., Inc., 136 Liberty Street, New York, is a small unit quickly attachable to any rotating member of a motor truck, and which accurately registers and totalizes the daily, weekly, monthly and yearly operating time of the machine with no winding and no charts to be changed.

Hoist and Body Units That Pay Real Profits

VAN DORN hoist and body units are profit producers because their action is positive and trouble-free because they are built to stand the gaff of hard, continuous service.

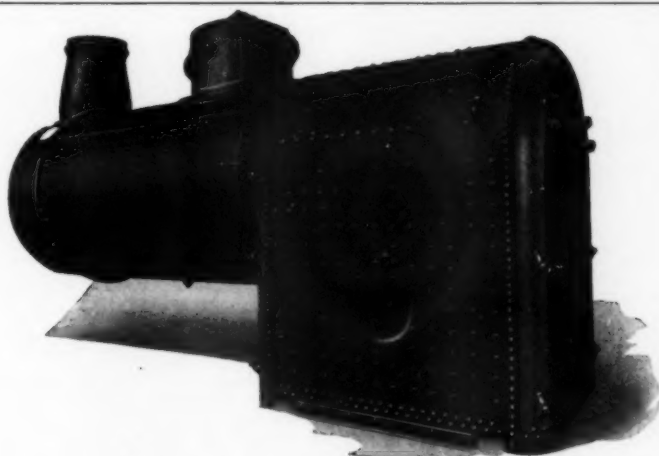
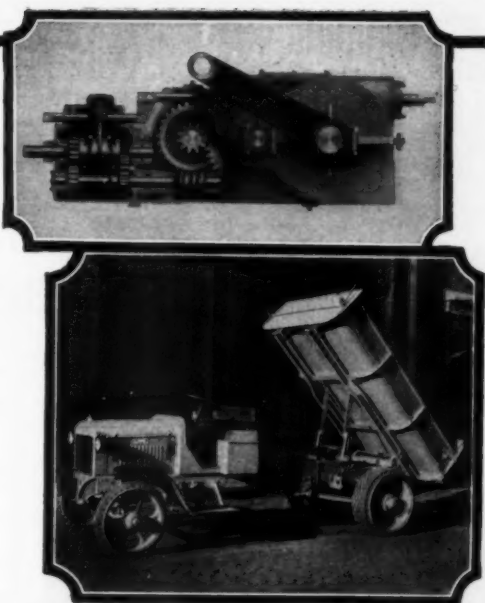
Constantly bathed in oil and operating on the worm gear principal the hoist mechanism cannot be surpassed for service. The body itself, while lighter than ordinary truck bodies, has a strength far out of proportion to its weight.

A Van Dorn mechanical hoist plus a Van Dorn body is a combination that means real profits for the operator.

THE VAN DORN IRON WORKS COMPANY
2685 E. 79th Street • Truck Division • Cleveland, Ohio
"More Pay Loads—More Profits"

Van Dorn

MASTERCRAFTSMANSHIP
IN STEEL



Have you a boiler problem?

JOHNSTON BROS., Inc.

Specializing in Boilers for Contractors' Equipment
FERRYSBURG, MICHIGAN

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American Steel & Wire Company's

WIRE FABRIC

"The Steel Backbone for Concrete"



Flat Sheets Loaded on Cars

Prompt Deliveries mean Profitable Contracts

THE American Steel & Wire Company with its unequaled facilities and large stocks is in position to make prompt deliveries of Wire Fabric Reinforcement.

This means profitable fulfillment of your contracts. Write or wire for quotation on current requirements.

American Steel & Wire Company

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*United States Steel Products Company



How do you move earth?

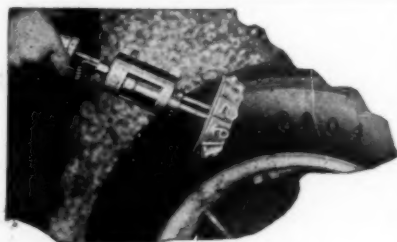
Have you tried the SCHAEFER way? Thousands prefer it because it is so easy to control all four operations (loading, dumping, spreading and leveling) without moving from the driver's seat; and because the SCHAEFER SCRAPER is safe, strong and economical.

Have you sent for our illustrated circular?

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CLEVELAND, O.



An Invisible "Tire Lock"

Stronger than chains, and more potent than the most powerful mechanical lock—Brand your tires with an Everhot Tire Branding Outfit and you can dispense with all other kinds of so called protection which don't protect.

Write for full details and prices

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America's Brand Makers
EVERHOT
MANUFACTURING CO. MAYWOOD, ILLINOIS

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A Trailer for Every Hauling Need



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Will be in Space
WW-67 at the
1928 Convention
and ROAD SHOW
January 9th-13th inc.
Cleveland, Ohio

HIGHWAY TRAILER CO.
503 Fulton Street
EDGEMONT, WIS.



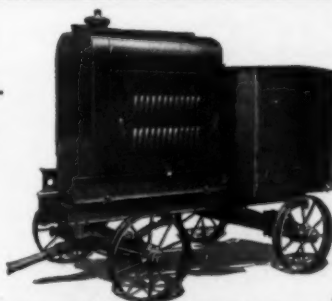
BUILT IN THE WORLD'S LARGEST TRAILER PLANT

YOUR FIRST CONCERN IS

— WATER —

Either you **NEED** it for the shovel or mixer and haven't got it,
or you've **GOT IT** in a hole or a trench where you don't want it.

If you need a never-failing supply of water a
"Domestic" GIANT self-oiling Triplex is the
pump outfit you are looking for.
Built for capacities 80, 100 and 150 gallons
per minute.



"Domestic" 35-A GIANT Road Pump
Unit



"Domestic" DL-4 Diaphragm Pump Unit

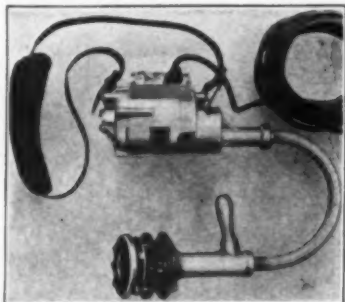
To rid that job of excess water the
"Domestic" new improved self-oiling,
enclosed engine type Diaphragm Pump Unit is your "best bet."
They get the water out of the hole
in a "jiffy" and keep the trench or
foundation absolutely dry.

Built in single and
double pump types—
capacities 8,000 to 24,
000 gallons per hour.

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DOMESTIC ENGINE & PUMP CO.,
SHIPPENSBURG, PA.
Mail me all the above address complete
☐ Describe outfit with complete
☐ Giant Triplex Road Pump
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type Diaphragm
Pumps
C.E.M.
12-27

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BERG CONCRETE SURFACER AND FINISHER



BERG "Regular" 1927 Model

BILLIARD-TABLE SMOOTHNESS

In removing fins, board or form marks and all irregularities from concrete construction, the BERG quickly and economically cuts down the surface to billiard-table smoothness. One man with a BERG can do the work of four rubbing by hand.

Also, it is unequalled for cutting brick walls preparatory to stucco application, grinding paint from bricks, and many other uses.

Interesting information concerning this handy time-, money- and labor-saving tool mailed upon request. Write today.

The Concrete Surfacing Machinery Co.

Pioneer Manufacturers of Machines for all Kinds of Concrete Surfacing

4669-71 Spring Grove Ave., Dept. F, Cincinnati, O.



Littleford Torch Burner Drying Holes in Street before Patching

LITTLEFORD PORTABLE OIL BURNERS

Used for supplying heat for tar and asphalt melting kettles, thawing and drying holes in roads before patching, thawing frozen piles of sand, gravel, coke, coal, stone, etc., heating mortar boxes in cold weather, drying concrete for waterproofing, heating concrete in mixers. Two types—circular and torch. Many other uses.

Write for Bulletin C-6, which gives full details

LITTLEFORD BROS.

485 East Pearl Street

Cincinnati, Ohio

200 hours



one diaphragm

In a recent test a Novo Diaphragm Pump pumped water steadily for 200 hours before the "Tripl-Life" Diaphragm even weakened, the ordinary diaphragm is good for only about 50 hours. That's one reason why the Novo Diaphragm Pump handles any capacity—from 50 to 10,000 g. p. h.—at a profit. Write today for complete details.

NOVO ENGINE COMPANY, 216 Porter St., LANSING, MICH.

NOVO THE NEW
DIAPHRAGM PUMP
Clarence E. Bement Vice-Pres. & Gen. Mgr.



DIXON'S FLAKE GRAPHITE

THERE is but one flake graphite and its name is DIXON. For 100 years this name has been synonymous with the best graphite obtainable.

An ideal natural lubricant recommended for cylinders and bearings, coating gaskets, etc.

No. 1 Coarse
Flake

No. 2 Powdered
Flake

Write for Circular 148-C

1827 — One Hundredth Anniversary — 1927

JOSEPH DIXON CRUCIBLE CO.

Jersey City, N. J.



Established 1827

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QUALITY

Fully Justifies

a Higher First Cost

REGARDLESS of commercial expansion or retrenchment—regardless of international relations—regardless of the development of new fields—in fact, regardless of economic forces, whether transportation demands be small or large, an ever-increasing percentage of buyers are learning from comparative operating costs records that there is an almost startling economy represented in the higher first cost of a MACK.

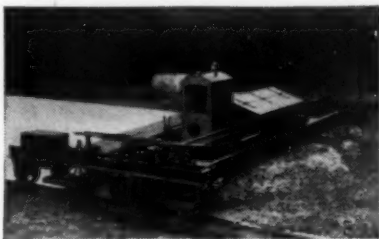
MACK TRUCKS, Inc.

25 Broadway

New York City

More than one hundred direct MACK factory branches operate under the titles of: "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," "MACK MOTOR TRUCK COMPANY," or "MACK TRUCKS OF CANADA, LTD."

Why Worry? Use an ORD Concrete Road Finisher



Worry in road-building becomes a thing of the past with an ORD on the job. You'll experience no delays, no breakdowns nor friction in getting the final O. K. from the road inspectors. You can use the ORD for roads from 9 feet wide to 30 feet wide, for finishing the full width, for half the road, or for adding a strip to an already existing road.

See Our Big Exhibit at the Road Show,
Cleveland, Ohio, January 9th to 13th
Space WW 44

A. W. French & Co.

Manufacturers of the ORD Concrete Road Finisher
8440 Lowe Ave. Chicago, Ill.



A POWERFUL TRACTOR for Snow Removal

One of two tractors owned by a county highway board and used constantly for three years, doing snow removal work in winter, and grading and hauling the rest of the year.

The parts cost has been less than \$100.00 per machine for three years.

The JT Tractor Company

E. 179th & St. Clair Ave., Cleveland, O.

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ERSTED

All Steel

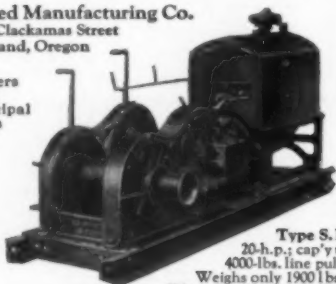
Automotive HOISTS

3
SPEED

worth more...
cost less...
than ordinary hoists!

Ersted Manufacturing Co.
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Dealers
in 30
principal
cities



Type S.F.
20-h.p.; cap'y to
4000-lbs. line pull
Weights only 1900 lbs.!

Write for Catalog Today!

1271

HAISS

PORTABLE CONVEYORS



For Loading
Crushed Stone,
Gravel, Sand,
Coal, etc.

Troughing and Flat
Belt Types

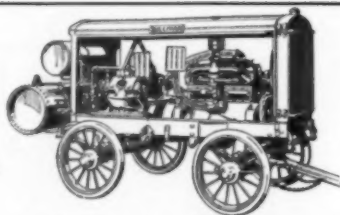
Every contractor will profit by using these
rugged machines to cut the cost of hand
shoveling. Ball-bearing rollers for long
life! Other advantages, too.

Ask for Catalog 925

Geo. Hais Manufacturing Co., Inc.

142nd St. & Park Ave.

New York



Staking Life on SULLIVAN Compressors

Seventy feet below the
bed of the Columbia
River, in Washington,
a crew of workmen
staked their lives on
the dependability of
Sullivan Portable Com-
pressors.

In building a million-
dollar bridge across
the Columbia at Van-
tage Ferry, Booth and
Pomeroy sunk two
caissons 60 feet, and 70

feet, in the river bed.
In the caisson pits, air
for the men to breathe
and to keep out the
water had to be main-
tained at 45 pounds
pressure—and 5 Sul-
livan 310-ft. Portable
Compressors ran for
five months to furnish it.
Whether life, or only
profits, are at stake,
depend on Sullivan
Compressors.

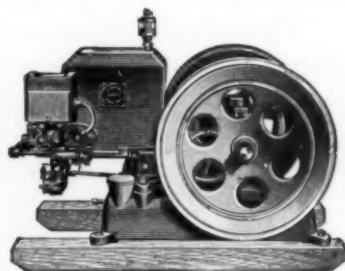
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SULLIVAN

Sullivan Machinery Company

162 So. Michigan Ave.

Chicago



STOVER ENGINES

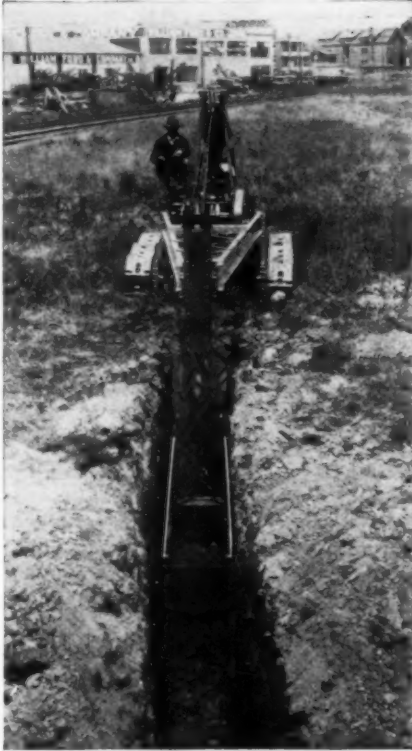
Reliable Power Plants
for Industrial Machinery

Contractors agree dependable, economical power
is vital to the satisfactory operation of industrial
machinery. More and more manufacturers spec-
ify Stover engines, because of their proven
superiority. The above illustration is of 2 H.P.
size. All sizes, Wico Magneto equipped.

35 Years of Engine Building Experience

For almost half a century Stover engines have
been famous for their in-built quality. Users
testify they are better today than ever before.
Service stations located everywhere. Write us
for FREE literature!

STOVER MFG. & ENGINE CO.
15 LAKE ST. FREEPORT, ILL.



WILFORD TRENCH HOE A MONEY-SAVER

Now you can have Wilford economy for trench digging. Digs a clean fourteen-foot trench—in a surprisingly short time. Trench hoe boom is interchangeable with booms for power shovel, crane, clamshell, dragline, backfiller and goose-neck crane. Fordson power, economy and universal service. Bulletin No. 7 gives full information. Copy sent cheerfully on request.

UNIVERSAL POWER SHOVEL CO.
WILLIAM FORD, President
Detroit, Michigan

BLYSTONE

Would you like to save money on your mixing jobs?

A BLYSTONE MIXER will save you the daily wages of a laborer, and at the same time—

give you a more thorough mix than you've ever had before,

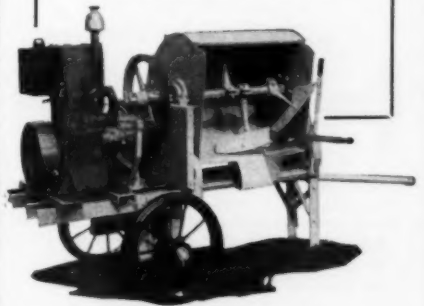
mix enough plaster to keep 25 plasterers busy, and

allow you to use 30-40 per cent more sand than when mixing by hand.

Invest a minute now; send for the BLYSTONE circular.

**BLYSTONE
MFG. CO.**

1227 C STREET
CAMBRIDGE SPRINGS, PA.



MIXERS



WHEELBARROWS

Lansing Wheelbarrows will speed up work for you. Built for hard work, strong and sturdy. Write for our catalog. We'll send it *Free*.

Write today

LANSING - COMPANY

LANSING, MICHIGAN

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When Snow Flies—

remove it
 quickly
 cheaply
 completely



An H. P. "One-Man" Grader

will keep miles of city streets or highways free from snow—at minimum cost.

Moves quickly—turns readily—steers easily and is simple, durable, economical and dependable.

Have an H. P. on hand, ready to clear roads after the first snowfall. Write us today for complete information.

W. A. RIDDELL COMPANY

Bucyrus, Ohio

Successors to The Hadfield-Penfield Steel Co.

Simplex Trench and Sewer Braces

Equipped with the Safety
 Unbreakable 3-Way Nut



The Simplex 3-way nut is safer than the old-style wing nut—more compact and durable—occupies less space and can be used more readily in close quarters.

Can be easily applied to any standard trench brace to replace broken wing nuts.

Write for Descriptive Bulletin

Templeton, Kenly & Co., Ltd.

Chicago, Illinois

Mfrs. of the Quality Simplex Lifting Jacks



The heart of your mixer is the power unit. Shut-downs are expensive. ALAMO ENGINES are serving others with dependable and efficient power. They can help you. Write us about your power problems.

ALAMO ENGINE CO.

Hillsdale,

Michigan



TWIN BACKFILLER

**BACKFILLS
SHOULDERS-ROADS
CLEANS DITCHES
EXCAVATES**

**On any contract
where you can
use one or two
scrapers this ma-
chine will pay for
itself.**

This unit mounted on a Fordson has made many friends—because of its many uses—because it stands up and does its work under all conditions—and because it SAVES REAL MONEY.

Let us send you our catalog

THE WATERMAN CORPORATION

687 East Fort Street

Detroit, Mich.



Kinney
TRADE MARK
REG. U.S. PAT. OFF.

**AUTO HEATER
& DISTRIBUTOR**

**More Miles Have Been Covered by the KINNEY Distributor
than by any other heater and distributor in the world.**

The KINNEY Heater and Distributor

will properly heat and apply the heaviest asphalts and tars as well as the lighter grades of bituminous road material with equal efficiency and with the least expenditure of time, labor and money.

Equipped with the Kinney Positive Pressure Pump and the Kinney Spraying Nozzles and circulating and heating systems. Self-loading from tank cars.

Write for Booklet

KINNEY MANUFACTURING COMPANY

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FLORY 35-H. P. GASOLINE HOIST

handling 14-cubic-foot concrete bucket. Contractors, Smith and Fenstermaker, Allentown, Pa.

S. Flory Mfg. Co.
Bangor, Pa.

Steam, Electric, and Gasoline Hoists

Sales agents in principal cities



HEIL for Service

There is no dumping problem with Heil Hoists and Bodies. We make equipment for every make and model motor truck. Picture above shows Heil "3 in 1" Combination Body L-51 and Heil Hydro Hoist 3-26 mounted on 2-ton Graham truck.

Write for Bulletin 179

THE HEIL CO.

1242-60 26th Ave. Milwaukee, Wis.

Moves Itself—and Other Equipment

The self-portability of Porta Hoist makes it a wonderful time and money-saver. It does its work rapidly and then moves itself and other equipment, under its own power, to the next job,—operating on as many as three or four different jobs in one day. Manufactured in single- and double-drum types,—both sturdily built, extremely flexible, and remarkably responsive to control.

Write for descriptive bulletins

PIONEER TRACTORS, Inc.
Winona, Minn.

Carried in stock, sold and serviced by established distributors in principal cities

PORTA-HOIST
CUTS YOUR COSTS



ONE-TWO BAGGER

BOSS MIXERS LEAD THE WORLD

Free Catalog

Showing latest improvements, labor-saving attachments, new models, and complete line of **BOSS** Mixers, Drums, Mixers, Heavy Duty Filters, Patented Hoists for every job. O.K'd by 17,500 users.

One-Two Bagger

The Famous Boss 105. A Sensible Blended Mixer for Any Job. Mixes one bag mix proportion or two bags 1 2 5 mix. Extremely compact. Weighs No More—Costs No More than same one baggers. **BOSS** Patented Rapid Discharging and Remotely Action gives 25 to 30 more batches per day. Steel or rubber lined wheels. With Crocodile Trucks convert to trailer power. Write for catalog.

THE AMERICAN CEMENT MACHINE CO., Inc.
Dept. 237 Keosau, Iowa

See our Booth No. E. H. 43 at the Cleveland Road Show, January 9th to 13th, inclusive

Blaw-Knox

PITTSBURGH, PA. 657 Farmers Bank Bldg.

BLAW-KNOX ROAD BUILDING EQUIPMENT

—Preferred by Contractors: Road Forms, Street and Sidewalk Forms, Measuring and Weighing Batches, Inundators, Self-cleaning Portable Batch-plant, Steel Bins, Turntables, Clamshell Buckets, Standard Steel Buildings and Calcium Chloride Machines.

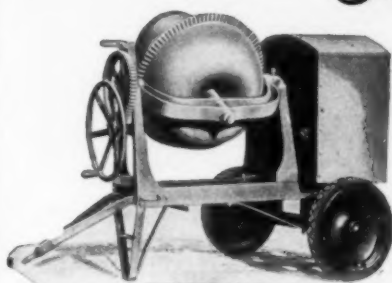
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BLAW-KNOX COMPANY

New York Chicago-Detroit-Baltimore-Birmingham-San Francisco-London, Eng.

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Popular **LAUSON** Outfits



**Highest Quality
Reasonably Priced**

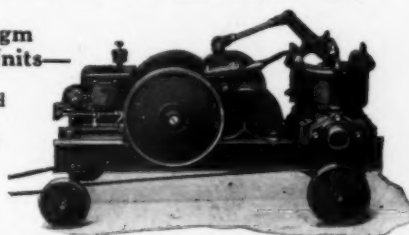
The Original Timken- Equipped Mixers

Simplicity of construction and uncommon ruggedness of all parts distinguish Lauson Mixers and account for their endurance qualities and ever-growing popularity. Where others are weak, Lausons have long since been made "strong"—the counter-shaft runs in oil on Timkens, effecting a great reduction in friction and assuring perfect alignment. Furnished in customary mountings—skids, all-steel wheels, disc wheels with solid rubber tires.

Built with an understanding of the strenuous task which falls to their lot—both engine and jack are rugged, well enclosed and trouble-proof. Every material factor and detail of design and manufacture are the highest in the field. Mounted on truck as shown, or semi-trailer, disc wheels, solid-rubber-tired. Make of pump desired, or with fittings only, ready to install your own pump.

Diaphragm Pumping Units—

Fully
Enclosed
Gears
Run in
Oil



We also build Plaster and Mortar Mixers, Contractors' Saw Rigs, Gas Engines for all uses, 2-35 H.P., and 35-45 H.P. heavy-duty Power Units.

THE JOHN LAUSON MFG. CO., 11 Jackson St., New Holstein, Wis.

CONTRACTORS LABORERS X TIME = DOLLARS



ASK
YOUR
DEALER

BATES WIRE BAR TIES

Will save you time, labor and dollars.

No skilled labor required to use this equipment.

Two or three turns with tying tool and bars are tied.

Ideal to use in cold weather—men do not have to take off their gloves.

Manufactured by

BATES VALVE BAG CORP.

35 East Wacker Drive
Chicago, Illinois

Tying Concrete Reinforcing Bars
with Wire Tie and Tying Tool

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ROAD BUILDING WITH EUCLIDS

They move earth quickly and economically. Euclid wheelers are built to withstand the most severe strains imposed by the heaviest tractors.

EUCLID CRANE & HOIST COMPANY, Euclid, Ohio

NEW! MIAMI BULLDOZER

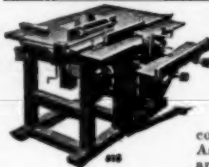
The Miami Bulldozer is power-operated. Blade is controlled by Miami power winch attached to power take-off of Model 20-K Cletrac. Positive controlled blade enables driver to raise or lower it without stopping tractor. The fastest operating unit of its kind on the market. Fills 100 feet of 3' x 6' trench in an hour. Moves 50 to 60 cubic yards of earth per hour. Works on all backfilling and grading work, on docks, in ship holds, on dumps and moving of snow. Will pay for itself in a few working days.

Let us give you complete details and uses. A card or letter will bring them

THE MIAMI TRAILER-SCRAPER CO.

610 S. Clay Street

Troy, Ohio



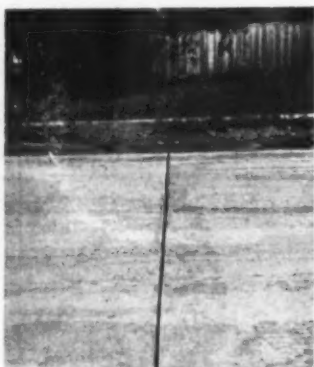
End COSTLY Delays

Your own woodworking shop—right on the job—means fast work, no delays, lower bids and more jobs—at greater profit. These Woodworkers are complete shops in themselves. Ask also about our Saw Rigs and Hoists.

Agents wanted for open territory

AMERICAN SAW MILL MACHINERY CO.

MAKERS OF WOODWORKING AND SAW MILL MACHINERY
171 Main Street Hackettstown, N. J.



No
Water
Gets
Between
These
Slabs

SEALTIGHT The Perfected Joint

prevents the entrance of water, sand and pebbles or other foreign matter into the expansion gaps between two slabs of concrete.

Sealtight adheres to the sides of the slabs, sealing the joint perfectly. And Sealtight stays in the joint—does not run out at the top where traffic will carry it away.

W. R. MEADOWS, INC.
ELGIN, ILLINOIS

Sealtight is made of a mixture of high-grade pure blown petroleum asphalt, specially blended for this product, and a long, flexible vegetable fibre filler. With this unusually tough fibre Sealtight is reinforced throughout and requires no reinforced sides.

Make the Road Right—Use "Sealtight"

HONHORST TAR HEATERS

"Built for service"

ALL STYLES

Portable and Stationary
25 to 200 gallons

See our page in Street Construction Section
Municipal Index for the Kettle you need

or

Write for Catalog

THE JOS. HONHORST CO.

1016 W. 6th St.

Cincinnati, O.

Did You Look

over the catalog items on pages 102 and 104 for interesting data on new and improved machinery and equipment for Contractors and Engineers who are anxious to keep up with the times? Write now for catalogs that meet your needs.

When writing to advertisers please mention the CONTRACTORS AND ENGINEERS MONTHLY—Thank You.

DISTRIBUTORS OF CONSTRUCTION EQUIPMENT

The following cards (arranged by states) show the names of dealers in contractors' equipment and supplies, with a record of the various lines handled. Buyers will find this list a convenient means of getting in touch with dealers who make a point of giving satisfactory service and prompt shipments.

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ALABAMA EQUIPMENT COMPANY

525 N. 28th Street

Birmingham, Ala.

Representing

REX Concrete Mixers & Pavers	CENTURY Cement Bag Cleaners
P & H Shovels & Cranes	WILLIAMSPORT Wire Rope
BARNES Pumps	FREEMAN Truck Turntables
ORD Concrete Finishing Machines	Dump Wagons & Trailers
RED STAR Wheelbarrows	Grader Blades, Trests & Flys
"TONCAN" Metal Culverts	Wheel and Drag Scrapers
CONNEAUT Hand Shovels	Grading and Rooter Plows
JONES-SUPERIOR Saw Rig	HELYZEL Road, Sidewalk, Curb and Gutter Forms
ACME Rollers & Crushers	Material Bins and Hoppers
MUNDY Hoists	Mattocks and R. E. Picks

ALABAMA

The Going Road Machinery Co., Inc.

1624 1st Ave.

Birmingham, Ala.

Contractors' Equipment

Representing

Jaeger Machine Co.—Mixers, Hoist and Placing Plants.
Cleveland Tractor Co.—Cletrac Tractors
Austin-Western Road Machy. Co.—Road Building Equipment of all kinds.
Domestic Engine & Pump Co.—Diaphragm and Force Pumps.

C. B. DAVIS ENGINEERING CO.

Brown Marx Bldg.

Birmingham, Ala.

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CONVEYORS
BELTS
SCREENS

PUMPS
BUCKETS
GEARS
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Morgan Engineering Co.
Nordberg Mfg. Co.
Wheeler Mfg. Co.
Aldrich Pump Company
G. H. Williams Company
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G. C. PHILLIPS TRACTOR CO.

1625-31 Ave. B, South, Birmingham, Ala.

Representing

RUSSELL—Road Building Machinery
BYERS—"Bear Cat" Cranes and Shovels
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Fairbanks-Morse & Co., Oil Engines, Pumping Machinery, Electric Motors, Home Light and Water Plants.
The Jaeger Machine Co., Concrete Mixers for every purpose.
Cincinnati Rubber Co., Dredging Sleeves, Section and Discharge Hose.
O. K. Clutch & Mach. Co., Hoisting Machinery.
American Saw Mill Mach. Co., Portable Woodworkers, Saw Benches, Etc.
Gould's Pumps, Inc., Power, Diaphragm and Hand Pumps.
Cement Block Mach. Co., "National" Concrete Block Machines.
Chicago Pneumatic Tool Co., Portable and Stationary Air Compressors, Air Lift Pumps, Etc.
Pipe, Valves and Fittings.
STOCK CARRIED IN ORLANDO

CONTRACTORS EQUIPMENT CO.

Miami, West Palm Beach, Orlando, Jacksonville, Florida

Representing

Ingersoll-Rand Compressors and Tools	Barnes Power Pumps
Rex Pavers and Mixers	Ord Conc. Bd. Finishers
Bestick Plaster Mixers	Street Bros. Hoists and Slacklines
Butler Bins and Batches	Leachons Wire Rope
Hotchkiss Steel Forms	Booshors
Lansing Barrows and Carts	Jones Superior Saw Rigs
	LeRoi Engines
	Syntron Hammers
	Goodyear Belt and Hose

BURRESS-CLARK MACHINERY CO.

Tampa, Florida

EXCLUSIVE DISTRIBUTORS FOR:

Chain-Belt Co., Rex Mixers
Street Bros., Gas, Steam & Electric Hoists
Street Bros., Derricks and Cableways
Barnes Mfg. Co., Power Pumps
Ingersoll-Rand Air Compressors
Speeder Shovels and Cranes
Lakewood Engr. Co., Chuting Equipment
H. W. Ross Co., Booshors
Jones Superior Saw Rigs
Halse Loaders
Sasgen Derricks, Winches, etc.
Butler Bins & Measuring Hoppers
Blystone Mfg. Co., Plaster & Batch Mixers
COMPLETE STOCK IN TAMPA
Member: Associated Equipment Distributors

L. D. LLEWELLYN, INC.

MIAMI FLORIDA

REPRESENTING:

American Mfg. Co.	Hercules Corp.
American Saw Mill Machy. Co.	Independent Pneumatic Tool Co.
American Steel & Wire Co.	Jawor Machine Co.
Anchor Concrete Mash Co.	Jackson Mfg. Co.
Archer Iron Works	Jeffrey Mfg. Co.
Austin-Western R. Mach. Co.	Wm. H. Keller, Inc.
Barber-Greene Co.	Mathews Conveyor Co.
Blystone Mfg. Co.	Metal Forme Corp.
Chicago Pneumatic Tool Co.	Page Engineering Co.
Cleveland Wheelbarrow & Mfg. Co.	Northwest Eng. Co.
Denver Rock Drill Mfg. Co.	Nevo Engine Co.
Electric Welding Co.	Rochester Can Co.
Erie Steel Const. Co.	Sasgen Derrick Co.
Fairbanks, Morse & Co.	Solramme, Inc.

Member: Associated Equipment Distributors

COULTER-HARTEQUIPMENT CO.

407 Eunice Ave. Tampa, Florida

Branch Offices:

2127 First Avenue, N. W. 930 West Bay Street
Miami, Florida Jacksonville, Fla.
Representing
KOEHRING CO.—Shovels, Cranes, Draglines, Mixers, Pavers
Bar Benders and Cutters, Sub-Grade Planers
BLAW-KNOX CO.—Bins, Batches, Inundators, Forms, Clam Shell Buckets and Turntables
NATIONAL HOISTING ENGINE CO.—Pile Hammers, Hoists
C. H. & E. MFG. CO.—Pumps, Saw Rigs and Hoists
BATES MANUFACTURING CO.—Tractors
RYAN MFG. CO.—Motor-Controlled Grading Machines
H. D. CONKEY CO.—Wheelbarrows
METALWELD SERVICE CORP.—Air Compressors
CLEVELAND ROCK & DRILL CO.—Rock Breakers, Drills
PAGE ENGINEERING CO.—Dragline Buckets
KOHLEH COMPANY—Lighting Plants
LE ROI ENGINE CO.—Gas Engines
HANDY SACK BALER CO.—Sack Cleaners and Balers

DISTRIBUTORS OF CONTRACTORS' EQUIPMENT

FLA.—GEORGIA

OGDEN MACHINERY CO. Inc.

17th Street and First Ave., Tampa, Fla.

Representing

NORTHWEST ENGR. CO.—Cranes, Shovels, Draglines, and Pull Shovels
PAGE ENGINEERING CO.—Dragline Buckets
OWEN BUCKET CO.—Clam Shell Buckets
DOMESTIC ENGINE & PUMP CO.—Diaphragm, Centrifugal & Force Pumps, Hoisting Engines
AMERICAN STEEL & WIRE CO.—Wire Rope
BARBER-GREENE CO.—Ditchers, Loaders and Conveyors
FOOTE COMPANY, INC.—Pavers
ACME ROAD MACHINERY CO.—Rollers
KOHLER COMPANY—Light Plants
LAKEWOOD ENGR. CO.—Concrete Placing Equipment, Finishing Machines, Mixers, Industrial Cars, Track, Etc.

YANCEY TRACTOR COMPANY

109-115 Booker Ave. Albany, Ga.

Representing

"CATERPILLAR" Tractors
ADAMS Graders
ATHEY Truss Wheels
BAKER-MANEY Automatic Wheelers
WATSON Dump Wagons and Trailers
KILLER Road Rippers, Rotary Scrapers
WIARD Flows
Wheel and Drag Scrapers
"RED EDGE" Shovels, Picks
"RED STAR" Wheelbarrows and Carts
JONES SUPERIOR Saw Rigs
KOPPEL Cars and Track
MUNDY Hoists

BARNES Pumps
BUFFALO-SPRINGFIELD Rollers
CHICAGO Auto. Conveyors
FREEMAN Truck Turntable
HVASS Flushers, Sweepers, etc.
HERCULES Gas Engines
HOTCHKISS Steel Forms
INGERSOLL-RAND Compressors
JOHNSON Bins and Hoppers
ORD Concrete Road Surfaces
McKIERNAN-TERRY File Hammer
P&H Shovels and Cranes
WILLIAMS Buckets
REX Concrete Mixers, Pavers

EDGAR ALEXANDER, Inc.

501-3 Whitehall St. Atlanta, Ga.

Representing

The T. L. Smith Co., Concrete Mixers and Pavers.
 Orban Crane & Shovel Co., Cranes, Excavators, Shovels.
 Jones Superior Woodworking, Saw Equipment.
 Universal Road Machinery Co., Refuse Crushers, Street Sweepers, Oilers, Car Unloaders, etc.
 Hotz Steel Form & Iron Co., Steel Forms for concrete work.
 Buffalo-Springfield Roller Co., Kelly-Springfield Rollers.
 Littleford Brothers, Littleford Tar and Asphalt Heaters.
 George Heiss Mfg. Co., Truck Loaders, Portable Belt Conveyors, etc.
 Archer Iron Works, Concrete Mixers and Cuts.
 Bay City Dredge Works, Motor Cranes, "One-Man Excavators."
 Cline Engineering Co., Internal Combustion Engines.
 Beach Manufacturing Co., Saw Tables.
 Keweenaw Incinerator Co., Incinerators for Homes and Institutions.
 Hyetone Manufacturing Co., Concrete and Plaster Batch Mixers.
 M. & M. Form Clamp Co., Column Clamps.

R. S. ARMSTRONG & BRO. CO.

676 Marietta St., Atlanta, Ga.

NEW EQUIPMENT IN STOCK

BEEBE BROTHERS—Cranes
BUTLER BIN CO.—Bins
BYERS—Shovels, Cranes, & Ditchers
CARBIC—Lights
CHICAGO—Air Compressors and Drills
CRESCENT—Saw Tables
CONTINENTAL—Motors
DOMESTIC—Pumps
EDWARDS—Shears
EMERSON—Pumps
FOOTE—Paving Mixers
GENERAL ELECTRIC—Motors
 Members: Associated Equipment Distributors

HERCULES—Engines
JAEGER—Concrete Mixers
LE ROI—Engines
LIDGERWOOD—Hoists
LOOKOUT—Boilers
PARKS—Saw Tables and Woodworkers
SASGEN—Derricks and Crabs
STUEBENER—Buckets
STROUDSBURG—Hoists
WATERLOO—Bar Benders
WORTHINGTON—Pumps

GEORGIA

It is our desire

to have this directory of dealers in construction equipment the most complete and accurate of its kind. Therefore, we would greatly appreciate any suggestions or corrections that you may have to offer.

CONTRACTORS' & ENGINEERS' MONTHLY

443 Fourth Ave.

New York

SOUTHEAST SUPPLY COMPANY

332 Edgewood Avenue

ATLANTA, GEORGIA

Representing:

Cleveland Tractor Company

Euclid Crane & Hoist Company

Austin-Western Road Machy. Co.

YANCEY BROTHERS, Inc.

634 Whitehall St., S. W. Atlanta, Ga.

"CATERPILLAR" Tractors
ADAMS Graders
ATHEY Truss Wheels
BAKER-MANEY Automatic Wheelers
WATSON Dump Wagons and Trailers
KILLER Road Rippers, Rotary Scrapers
WIARD Flows, Wheel and Drag Scrapers
"RED EDGE" Shovels, Picks
"RED STAR" Wheelbarrows and Carts
JONES-SUPERIOR Saw Rigs
KOPPEL Cars and Track
MUNDY Hoists
 Member: Associated Equipment Distributors

BARNES Pumps
BUFFALO-SPRINGFIELD Rollers
CHICAGO Auto. Conveyors
FREEMAN Truck Turntables
HVASS Flushers, Sweepers, etc.
HERCULES & LE ROI Engines
HOTCHKISS Steel Forms
INGERSOLL-RAND Compressors
JOHNSON Bins and Hoppers
ORD Concrete Road Surfaces
McKIERNAN-TERRY File Hammer
P. & H. Shovels and Cranes
WILLIAMS Buckets
REX Concrete Mixers, Pavers
HAISS Truck Loaders

A. B. MOORE, JR.

Arcade Bldg.

Savannah, Ga.

REPRESENTING

Lakewood Engineering Company
Helms Steel Form & Iron Co.
Easton Car & Construction Co.
Barber-Greene Company
Northwest Engineering Co.
Buffalo Springfield Roller Co.
Domestic Engine & Pump Co.
Sterling Wheelbarrows
Wyoming Shovels
Automatic Signal & Sign Co.
Redflex Warning Signals Co.
EVERYTHING
IN CONTRACTORS' EQUIPMENT

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

ILLINOIS

DEALERS EQUIPMENT COMPANY

3673 So. Michigan Ave. Chicago, Ill.

Representing

ALLISON-WILLAMETTE Hoists
 MIAMI Fordson Scraper
 NORTH Hydraulic Digger
 UNIVERSAL Power Shovel
 SCHRAMM Air Compressors
 Grading Machinery
 Excavating Machinery

"Everything for the Fordson"

ENGINEERING PRODUCTS COMPANY

Arthur Fraunitz, Pres. Carl J. Gregersen, Secy.

Peoples Gas Bldg., Chicago, Ill.

RAILS — FROGS — SWITCHES
 TRACK — MATERIALS
 RAIL BENDERS,, etc.

REPRESENTING

EASTON Car & Construction Co.
 Industrial — Quarry and Constructor's CARS.

Mid-West Locomotive Works
 Gasoline Locomotives

L. Z. HOWELL

755 Old Colony Bldg. Chicago, Ill.

Phone: Harrison 3401-5127

Representing

LINK-BELT CO. — GENERAL EXCAVATOR CO.
 Crawler Type Shovels, Draglines, Clamshells,
 Trench Hoes $\frac{1}{2}$ to $1\frac{1}{4}$ Cubic Yards

ELECTRIC WHEEL CO.

Five- and Ten-Ton Crawler Tractors

KOHLER CO.

Automatic Electric Plants

R. H. HYLAND CO.

221-225 W. Huron St., Chicago, Ill.

Exclusive Representative

Smith Concrete Mixers and Pavers
 McKiernan-Terry Pile Hammers
 Insley Steel Towers and Chutes
 Norton Ball Bearing Jacks
 Wyoming "Red Edge" Shovels
 Williams Clam Shell Buckets
 Clyde Hoisting Engines
 Barnes Pumping Outfits
 Ingersoll-Rand Air Compressors
 M & M Form Clamps
 Essick Plaster Mixers
 Jones Superior Saw Rigs
 Atlas Adjustable Shores

Member Associated Equipment Distributors

ILLINOIS

W. B. LOUER COMPANY

Construction Equipment

431-5 So. Jefferson St. Chicago, Ill.

"CATERPILLAR" Tractors.

LAPLANT-CHOATE Dump Wagons, Scrapers,
 Bulldozers, Snow Plows, etc.

WAUSAU Snow Plows.

KILLEFER Road Tools.

SHAW Land Levelers.

D-A Lubricants.

High Pressure Pumping Equipment.

Phones: Michigan 1130-1131 Send for Catalogue

Member: Associated Equipment Distributors

Lowe-Peters Equipment Co.

612 No. Michigan Ave. Chicago, Ill.

Representing

MULTI-FOOTE—Pavers

HAISS—Truck Loaders and Clamm Shell Buckets

BAY CITY—Convertible Excavators, Tractor

Cranes and Dredges

WEBBER—Trailers

SEAVERN—Road Paver Bins and Measuring

Hoppers

HUMPHREYS—Force and Diaphragm Pumps

FLOYD—Hoists

NORTHERN—Conveyors and Bag Cleaners

AMERICAN—Slack Line and Drag Scrapers

SUPERIOR SUPPLY COMPANY

1836-60 South Kostner Avenue, Chicago, Ill.

DISTRIBUTORS

Novo Engine Company

Chain Belt Company

Butler Bin Company

The Huber Mfg. Co.

Sullivan Machinery Co.

Metal Forms Corporation

Freeman Manufacturing Co.

Milwaukee Locomotive Mfg.

Company

"Seal Tight" Expansion Joints

Lakewood Engineering Co.

A Complete Line of Construction Tools
 and Equipment Carried in Chicago.

TELEPHONE: CRAWFORD 6200

WESTERN CONTRACTORS SUPPLY CO.

Complete Equipment and Supplies

14 No. Clinton St., Chicago, Ill.

Representing

DOMESTIC ENGINE & PUMP CO.—Pumps

Hoist, Air Compressors, Engines

KNICKERBOCKER CO.—Concrete, Plaster

and Mortar Mixers, Saw Rigs

WIARD PLOW CO.—Contractors' Plows

HAGGARD & MARCUSON CO.—Camp Bunks,

Cots and Supplies

RUSSELL GRADER MFG. CO.—Graders,

Scrapers

NATIONAL BRAKE & ELEC. CO.—Portable

Air Compressors

Members: Associated Equipment Distributors

DISTRIBUTORS OF CONTRACTORS' EQUIPMENT

INDIANA—IOWA

JOHNS EQUIPMENT COMPANY905 First National Bank Building
FORT WAYNE, INDIANA

NORTHERN INDIANA DISTRIBUTORS

MASSILON POWER SHOVEL COMPANY

Shovels, Cranes and Draglines

BYERS MACHINE COMPANY

"Bear Cat" Cranes and Shovels

CHICAGO AUTOMATIC CONVEYOR COMPANY

Material and Coal Conveyors

MIXERS

PUMPS

HOISTS

IOWA—KANSAS—KY.

GLOBE MACHINERY & SUPPLY CO.

Des Moines

Iowa

Representing

Chain Belt Co.

G. H. Williams Co.

Butler Bin Co.

Archer Iron Works

Sterling Wheelbarrow Co.

Freeman Mfg. Co.

Wyoming Shovel Works

Holtzel Steel Form &

Iron Co.

New Engine Co.

Sullivan Machinery Co.

Electric Wheel Co.

Gould Pumps, Inc.

Philip Carey Co.

Byron-Jackson Co.

Keystone Driller Co.

Le Roi Co.

Waukesha Motor Co.

Erie Steam Shovel Co.

Syntron Co.

Northern Conveyor &

Mfg. Co.

George Haiss Mfg. Co.

Bee Corporation

Member: Associated Equipment Distributors

Knox Engineering and Equipment Co.Road Building Machinery and Contractors' Supplies,
Car Loaders and Unloaders, Cranes, Hoists
and Boilers.

32 No. Senate Avenue,

Indianapolis, Ind.

Representing

Smith Engineering Works

Bay City Dredge Works

Jeffrey Mfg. Co.

Union Iron Works

Orr & Samsower, Inc.

Koppel Car Works

Advance Foundry Co.

Deister Concentrator Co.

Abram "Blue Ribbon" Block

Machines

POWER EQUIPMENT COMPANY

1723-25 GRAND AVENUE, DES MOINES, IOWA

REPRESENTING:

Schramm, Inc., Compressors

Ruckstell Sales & Mfg. Co.,

Ruckstell Axles

Loosan Leader Co., Loosan

Loaders

Hughes-Kennan Co., Dump

Bodies, Iron Mules

Anthony Co., Dump Bodies

Whithead & Kales Co., Cranes,

Rubber Tractor Wheels,

Street Flushers

Belle City Mfg. Co., Crawlers

Universal Power Shovel Co.,

Shovels, Clamshells

Trackson Co., Crawlers

Ersted Machinery & Mfg. Co.,

Hoists

Williamette Iron & Steel Co.,

Hoists

Wehr Co., Graders, Rollers

The Perry Co., Fresno Scrapers

Miami Trailer Scraper Co.,

Wheel Scrapers

The Trailmobile Co., Tractor

Trailers

O. S. Wise Pulverizer Co.,

Crushers, Pulverizers

Brookville Truck & Tractor Co.,

Locomotives

PERRY & WILSON EQUIPMENT CO., Inc.

345 E. South St.

Indianapolis, Ind.

Representing

Caterpillar Tractor Co.—"Caterpillar" Tractors

Geo. Haiss Mfg. Co.—Gravel Loaders

Killefer Mfg. Co.—Road Tools

LaPlant-Choate Mfg. Co.—Wagons and Bull

Dozers

Hi-Way Service Corp.—Snow Plows

D. A. Lubricant Co.—Tractor Lubricants

Baker Mfg. Co.—Maney Scrapers

Rex-Watson Corp.—Tractor Wagons

Wiard Flow Co.—Tractor Plows

H. W. CARDWELL COMPANY, Inc.

300 S. Wichita Street

Wichita, Kansas

Representing

Caterpillar Tractor Company

La Plant-Choate Mfg. Company

Baker Manufacturing Company

GIERKE-ROBINSON COMPANY

Distributors of Contractors' Equipment

Suite 306, Kahl Bldg.,

DAVENPORT,

IOWA

SMITH—Concrete Mixers and Pavers.

AUSTIN—Trussing Machines, Bank-Silers.

BLAW-KNOX—Steel Road Curb Gutter Forms, Steel Storage

Bins, Batcher, Chalk Shell Buckets, Trunk Turntables.

CLYDE—Gasoline Builders Hoists, Steam Hoists, Drivings.

BARNES—Triplex and Quadruplex Road Builders Pumps.

ORD—Concrete Road Surfacers.

Wheelbarrows, Sips, Wheel Scrapers, Fresno, Gas and Steam

Rollers Hook Crushers, Graders, Wire Rope, Hoes, NORTH-

WEST Cranes, Power Shovels and Draglines, SULLIVAN Air

Compressors, Air Tools, etc.

Members of Associated Equipment Distributors

THOMAS L. BARRET

Contractors' Equipment

LOUISVILLE, KY.

REX Mixers and Pavers.

KENNEDY Gearless Crushers.

WILLIAMS Chalk Shell Buckets.

ARMSTRONG Blast Hole Drills.

HAISS Material Handling Equipment and Loaders.

MUNDY Hoisting Equipment.

BUSSELL Road Equipment.

UNION Hammers and Concrete Buckets.

TRIANGLE and Welded Mesh.

CORRUGATED Bars.

BARRET Asphalt Expansion Joint.

VOLCAN IRON WORKS, Steam & Gas Locomotives.

JOHNSON Bins and Measuring Hoppers.

HUG Trucks, Turntables and Subgraders.

METAFORM Road Rail, Etc.

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

KENTUCKY—LOUISIANA

LOUISIANA

Brandels Machinery & Supply Co.

325 W. Main St.,

Louisville, Ky.

Representing:

J. D. Adams & Co.
Barber-Greene Co.
Beach Manufacturing Co.
Blaw-Knox Co.
Buffalo-Springfield Roller Co.
A. S. Cameron Steam Pump Works
Climax Engineering Co.
Domestic Engine & Pump Co.
Erie Steam Shovel Co.
A. B. Farquhar Co.
A. W. French & Co.
Fate-Root-Heath Co.
Cyclone Fence Co.
Wood Shovel & Tool Co.

Ingersoll-Rand Co.
Inley Mfg. Co.
LeROI Co.
A. Lechman & Sons Rope Co.
McKernan-Terry Drill Co.
Saugen Derrick Co.
Sawman Bros.
T. L. Smith Co.
Smith Engineering Works
Sterling Wheelbarrow Co.
Clyde Iron Works
Rea-Watson Corp.
Western Wheelbarrow Co.
Morseberg Mfg. Co.
Littleford Bros.

Member: Associated Equipment Distributors

ROY C. WHAYNE SUPPLY CO.Opposite City Hall—608 W. Jefferson St.
LOUISVILLE, KY.

"GATERPILLAR" Tractors
KORHRLING Shovels, Cranes, Pavers
JAEGER Concrete Mixers
HELTEL Steel Forms
BYERS "Bear Cat" Excavator
BARNES Pumps
SULLIVAN Compressors, Drills, etc.
FLORY Hoists, Cableways, etc.
R. H. BEAUMONT Cable Drag Scrapers

CONSTRUCTION EQUIPMENT OF ALL KINDS

Member: Associated Equipment Distributors

The CLYDE COMPANY, Inc.

309 MAGAZINE ST.

NEW ORLEANS, LA.

Beach Saw Rigs.
Clyde Hoisting Engines and Equipment.
Lakewood Concrete Mixers.
Northwest Crawler Cranes, Shovels, etc.
Ohio Locomotive Cranes.
Sawman Cableway Erecting Machinery.
Sterling Wheelbarrows.
Barnes Power Pumps.
Atlas Mortar Mixers

Wood Molybdenum Shovels.
Universal Truck Cranes.
Wander Concrete Mixers.
Atlas Adjustable Shores.
Erie Steel Bins, Aggregators
M. & M. Form and Column Clamps.
Freeman Turntables.
Barber-Greene Conveyors
Loaders, Ditchers.
Sullivan Air Compressors.
Teledo Torches

Member: Associated Equipment Distributors

A. M. Lockett & Co., Ltd.Queen and Crescent Building
New Orleans Louisiana

Representing

Worthington Pump & Machy. Corp.
Construction Specialties Co.
Williamsport Wire Rope Co.
Robins Conveying Belt Co.

LOUISIANA ROAD MACHINERY COMPANY

1111 Julia Street

NEW ORLEANS

LOUISIANA

Representing:

Jaeger Machine Co.—Concrete Mixers and Pavers.
Speeder Mach. Corp.—Auto-Cranes and Draglines.
Elgin Corp.—Street Sweepers and Educators.
Eagle Dump Wagons.
Russell Grader Manufacturing Company.
Buffalo-Springfield Roller Company.
Cyclone Fence Co.
Universal Rock Crusher Company.
Lyle Culvert & Road Equip. Co.

OLE K. OLSEN

325 N. Cortez St.

New Orleans

REPRESENTING

Ransome Con. Mach. Co.	Atlanta & Atlantic Terra
McKernan-Terry Drill Co.	Cotta Co.
Amer. Cement Mach. Co.	Wyoming Shovel Works
Amer. Saw Mill Mach. Co.	Blaw-Knox Co.
Mundy Hoisting Engine Company	Patent Scaffolding Co.
Northwestern Expanded Metal Co.	Universal Form Clamp Co.
Concrete Steel Co.	Atlas Engineering Co.
Schramm, Inc.	Blystone Mfg. Co.
Truscon Laboratories	LeROI Co.
Dahlstrom Metallic Door Co.	Cleveland Wheelbarrow Co.
Ralph B. Carter Co.	H. W. Boos Co.
Member: Associated Equipment Distributors	Amer. Steel & Wire Co.

C. T. PATTERSON COMPANY, Inc.

800 So. Peter Street,

New Orleans, La.

Representing

BAY CITY DREDGE WORKS	C. H. & E. Saw Rigs, Hoists
GEO. HAISS MFG. CO.	Pumps, Material Elevators
RUMSEY PUMP CO.	STOCKLAND Graders,
LA PLANT-CHOATE MFG. CO.	Dirt Handling Tools
COLUMBIAN ROPE CO.	FAIRBANKS Wheelbarrows
HAUCK MFG. CO.	LE ROI Engines
DAYTON SURE GRIP & SHORE CO.	WRIGHT Hoists
EASTON CARRIAGE EQUIPMENT CO.	SIMPLEX Jacks
CLEVELAND BLOCK CO.	CLEVELAND Tractors
CLEVELAND ROCK DRILL CO.	HANDY Sack Balers
AMERICAN STEEL & WIRE CO.	
REX Mixers and Pavers	

Reinforcing Steel—Our Specialty

Southern States Equipment Co., Inc.

801 New Orleans Bank Bldg.

NEW ORLEANS

"Ord" Concrete Finishing Machines
"P&H" Shovels and Cranes
"Parsons" Trench Excavators and Backfillers
"Telamith" Sand and Gravel Plants
"Williams" Clam Shell Buckets
"Hotchkiss" Steel Road Forms
"Orr & Sombower" Hoisting Engines, Boilers and Concrete Mixers
"Hug" Trucks and Turntables
"Foots" Paving Mixers
"Standard" Heating Kettles
"Archer" Concrete Chuting
"Domestic" Pumps and Engines
"Union" Pile Hammers
"Koppel" Industrial Cars and Track
"Handy-Andy" Pulling Jacks
"Butler" Steel Bins and Measuring Hoppers

DISTRIBUTORS OF CONTRACTORS' EQUIPMENT

LA.—MARYLAND

Woodward Wight & Co.
(THE LARGEST GENERAL SUPPLY HOUSE SINCE 1887)

NEW ORLEANS

LOUISIANA

Representing

Truscon Steel Co.
Solvay Sales Corp.
Josam Mfg. Co.
Burt Mfg. Co.
The Hayward Co.
Vulcan Iron Works
Marsh-Capron Co.
Rex-Watson Corp.
Humphreys Mfg. Co.
Atlas Powder Co.
Lidgerwood Mfg. Co.
Wyoming Shovel Co.

The Truscon Laboratories
Marion Steam Shovel Co.
American-Terry Derrick Co.
Page Engineering Co.
Western Wheel Scraper Co.
Hercules Powder Corp.
John A. Rosbling's Sons Co.
Plymouth Cordage Co.
Climax Engineering Co.
Chicago Pneumatic Tool Co.
Pulsometer Steam Pump Co.
American Steam Pump Co.

Austin-Western Road Machinery Co.

WORMINGTON & POWERS, Inc.
337 Howard Avenue, New Orleans, La.

Representing

LITTLEFORD BROS. CO.—
Tar & Asphalt Heaters,
Road Builders' Supplies.
THE KNICKERBOCKER
CO.—Concrete & Mortar
Mixers, Saw Rigs.
INSLEY MFG. CO.—Excavators,
Concrete Placing
Equipment, Steel Derricks.
SASGEN DERRICK CO.—
Derricks for all purposes.
YEOMANS BROTHERS CO.—
Municipal Sewage Pumping
Apparatus.

MEAD-MORRISON MFG
CO.—Steam, Gas & Elec-
tric Hoists & Car Pullers,
Full-Swing Caterpillar
Cranes.
MUNDIE MFG. CO.—Gas &
Electric Air Compressors.
METAL FORMS CORP.—
Building, Gutter, Curb,
Sidewalk & Road Forms.
ECONOMY ENGINEERING
CO.—Portable Hoists.
A. S. MARLOW—"Mario"
Med-Hog Pumps.

Shreveport Machinery Sales Co.Contractors' Equipment — Saw Mill Machinery
927 Giddens-Lane Building Shreveport, La.

REPRESENTING:

Barber-Greene Co., Ditchers, Loaders, Conveyors
Thew Shovels, Cranes and Draglines
Orr and Sembower, Hoists, Steam, Electric, Gasoline,
Concrete Mixers, Engines and Boilers
Barnes Mfg. Co., Power Pumps for all purposes
Vogt Bros. Mfg. Co., Steam Pumps, Fire Pumps
Fuller & Johnson Mfg. Co., Farm Engines, Electric
Light Plants, Pumping Outfits, Fire
Pumping Units
Teismith, Gravel and Quarry Plants
Schramm, Inc., Air Compressors

ALBAN TRACTOR COMPANY, Inc.
1019 No. Eutaw St. Baltimore, Md.

Representing

Caterpillar Tractor Company
Athey Truss Wheel Company
Fox Rotary Snow Broom Company
General Excavator Company
Killefer Manufacturing Company
LePlant-Chasteau Mfg. Company
Rex-Watson Corporation
Rotary Snow Plow Company
Stockland Road Machinery Company
Union Iron Works
Williamette Iron & Steel Works
Butler Manufacturing Company
Frick Snow Plow Company
D-A Lubricant Company
Highway Trailer Company

MD.—MASSACHUSETTS

THOS. M. BROWN

106 So. Gay St.

Baltimore, Md.

REPRESENTING

Koehring Company
Concrete pavers, mixers, cranes and shovels.
Heltzel Steel Form & Iron Company
Road forms, aggregate batchers
J. D. Adams & Company
Leaning Wheel Graders.
Keystone Driller Company
Shovels.
Huber Manufacturing Company
Gasoline rollers.

JOHN C. LOUIS

221 S. Eutaw St. Baltimore, Md.

REPRESENTING

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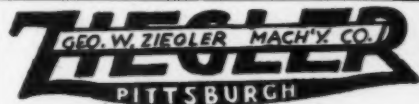
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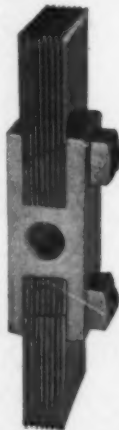
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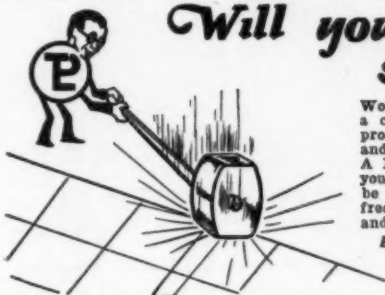
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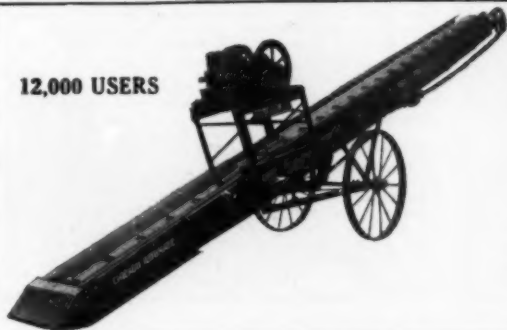
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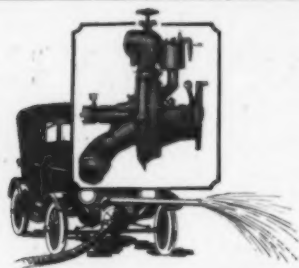
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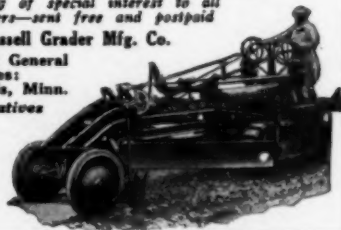
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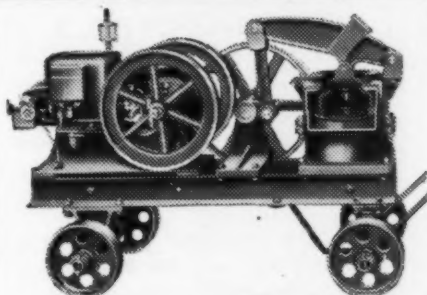
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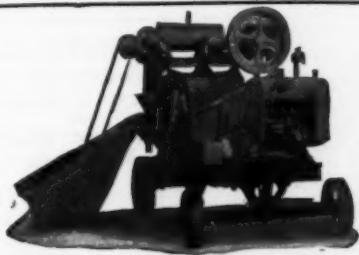
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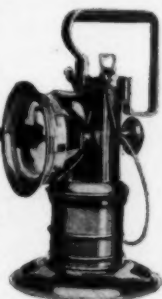
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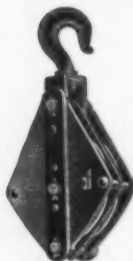
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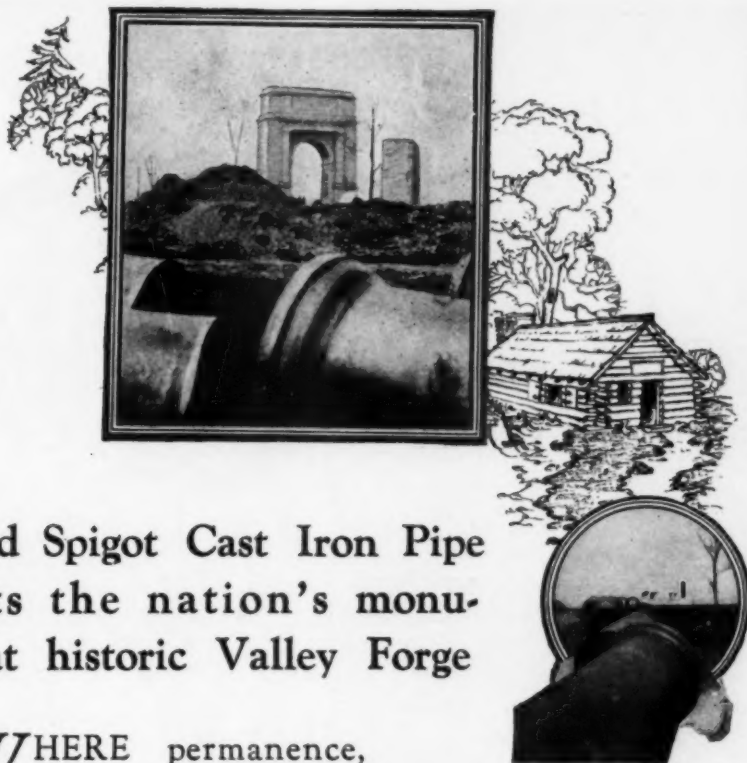
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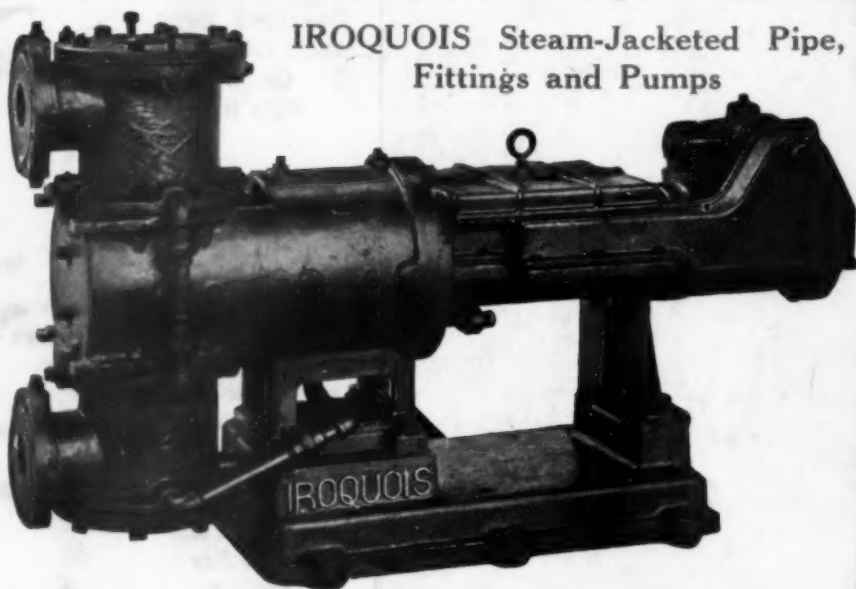
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